



# **The Electronic Anti-Scale System**

## Reference Book

CWT  
Christiani  
Wassertechnik



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# Over 70 Years

## CWT - Christiani Wassertechnik



CWT is a family owned and operated business with its own factory for water treatment technologies in Germany. The production of the highest quality devices with the most advanced technology together with the continual research and commitment led to the success of the product line:



### The electronic anti-scale system

The green alternative to water softeners



In this booklet you will find a selection of references by private, commercial and industrial users of the Vulcan anti-scale units. A number of independent studies reflect on the eco-friendly technology of physical water treatment in general and on the Vulcan-Impulse-Technology in specific. You will also find numerous independent studies and scientific papers on the principle of the eco-friendly physical water treatment and on the Vulcan units.

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### CWT Contact

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10997 Berlin  
Germany

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Web world:  
[www.cwt-international.com](http://www.cwt-international.com)

Web USA/Canada:  
[www.vulcan-descaler.com](http://www.vulcan-descaler.com)

USA dial: +1 (917) 300-0494



# Restaurants and Food Production



## Kitchen of Spokane School

USA

### International Water Treatment NA LLC

2607 Bridgeport Way W Ste.1J  
University Place, WA 98466  
www.iwtna.com

## Vulcan in a School Kitchen

Dear CWT Team,

The steam convection oven has greatly improved since the installation of the Vulcan. The water is injected via the pipe in the centre of the heating coils and a fan inside the coils blows the water through the coils and comes out as steam. The operating temperature of this device is 350F. The white material you see on the coils is a powder coating that is easily removed with a wet cloth. No more chemicals are required to clean the convection oven.

However, we have noticed even greater results in the school kitchen, which was previously using a traditional water softening system. But all in all, we can confirm the effectiveness of the Vulcan treatment, which means less work for the maintenance staff.

The Vulcan unit installed on the entire building system has also been extremely effective. No more rusty water after weekends and Christmas break. The next Vulcan will be installed on the other school buildings, which are around 20 – 25 years old.

The last Vulcan unit is installed on the main cooling tower – we have had nothing but positive news in regards to this installation. We will be seeing more orders coming from this customer very soon.

Best Regards  
Arne Vestad



# TA Truck Stop — Moriarty, New Mexico

USA



## Moriarty Travel Center



REFUEL



REPLENISH



REFRESH



REPAIR



RESCUE



REWARDS

Here in Moriarty N.M. we have extremely hard water.

In our truck stop we have to always clean up after it. The showers are a particular problem. From clogged shower heads, to constant cleaning and scrubbing to keep them clean.

It also wreaks havoc with the boilers and water heaters. After Andy and Vulcan Water Products installed the S100 unit on the main line, we noticed real soon, that the showers were becoming cleaner, and the discoloration in the water was gone too!

In our Country Pride restaurant, they noticed a dramatic change in the color and clarity of the iced tea and coffee, cleaner, spotless glassware and dishes, and the ice machine makes clean ice! We are very pleased with the results. Thank you Vulcan!

Signed,

John Hathaway GM  
Jack Reneker AGM

TA Operating LLC  
Moriarty, NM 87035



Vulcan S100 installed on the main water line



# White Castle Burger Restaurant — New York

USA



## Installation of Vulcan water treatment



**Installation site:** White Castle #32, New York, USA  
**Model:** Vulcan 3000 (installed on the ice machine after the carbon filters)  
 Vulcan 5000 (installed on the main inlet line)

### White Castle #32 – May 5

We installed a Vulcan 5000 on the main inlet line to White Castle 32 & a Vulcan 3000 on the ice machine after the carbon filters.

The R2D2 was cleaned and the calcium completely removed in one area. There is a slight indentation into the pan at the water line.



Before Vulcan installation - hard scale build up in the pan area



After Vulcan installation - pan area is now completely scale free

# Mövenpick Restaurant

Germany

Mövenpick Restaurant  
Potsdam



Christiani Wassertechnik GmbH  
Charlottenstraße 18

10117 Berlin

## Reference Letter

Dear Sir,

our Mövenpick Restaurant opened in January 2000. After a short period of time we noticed a high level of limescale developing on the ice-cream makers. These calcification's could only be cleared bit by bit which is a time consuming process. To avoid potential losses, a short-term limescale filter was installed. The operating time of this filter is limited however and thus resulted in high costs.

At a trade fair visit we consulted the company Christiani Wassertechnik GmbH about other possibilities. We installed the limescale converter Vulcan 5000 and the ice-cream makers have been functioning smoothly for 10 months now.

The limescale, which accumulates especially in the crushed ice makers, can now be easily removed as it is converted into fine-grained structures.

We wish the company Christiani further success with their excellent products.

Yours Sincerely,

Marcel Charrier  
Director

Mövenpick Zur Historischen Mühle Sanssouci  
Zur Historischen Mühle  
14469 Potsdam  
Tel.: 0331 / 78 12 93  
Fax 0331 / 281 49 50



Vulcan 5000



Vulcan protecting the ice machine



Vulcan protecting the ice-cream makers



Soft limescale is now easily removed

Mövenpick Restaurant, Potsdam

[www.moevenpick.com](http://www.moevenpick.com) | Mövenpick Restaurants Deutschland GmbH



## o2 Water Margin Restaurant

United Kingdom



The O<sub>2</sub>



To whom it may concern,

We are a very busy 300-seat restaurant at the O2 London Arena and have had major problems in the past with lime scale in our glass and line washing machines, sinks, food warmers and toilets. We have installed various products in the past to remove this scale with little success, resulting in higher maintenance and replacement costs along with increased expenses on cleaning equipment.

Since CWT Partners Ltd installed the Vulcan S25 at our premises we have noticed substantial and continual improvement over the past 3 months. Our food warmers, steam ovens, kitchen sinks and restrooms are clear of scale, along with cleaner crockery and cutlery. This has helped to reduce the detergent and cleaning equipment and products, which has saved us more than the cost of installing the Vulcan S25. The restaurant is now able to operate at a higher level, avoiding lime scale and rewashing of dishes, with far fewer complaints from customers.

It is a pleasure to inform you that we are very satisfied with the Vulcan S25 descaling unit. Additionally, we would like to single out the professionalism of the CWT team that addressed our lime scale problem and like to thank them for all their help. We highly recommend the Vulcan water treatment and urge others clients to install it.

Yours sincerely,

A handwritten signature in blue ink, appearing to read "Chin Lam".

Chin Lam  
CEO



**Novari (at the O2) LIMITED**

Registered office: 23 Entertainment Avenue, The O<sub>2</sub>, Greenwich, London,  
SE10 0DY

## Cricklewood Restaurant

USA

### Vulcan Descaler in Cricklewood Restaurant

Santa Rosa, California



CWT Distributor: Quest Green Solutions  
Santa Rosa, California  
E.E. U.U.

Location: Cricklewood Restaurant  
Santa Rosa, California  
E.E. U.U.

Unit installed: Vulcan 3000



Scale free dishwasher



Vulcan 3000



Cricklewood Restaurant Santa Rosa, California - E.E. U.U.

## Wolfies Waterfront Grill

USA



Salt-Free Water Systems, LLC  
1429 Casco Bay Circle  
Cicero, IN 46034  
Attn. Jim Schneider and Dick Van Voorhis

Dear Jim and Dick,

I want to let you know how satisfied I am with the results using the Vulcan 5000 water conditioner in my restaurant, Wolfies Waterfront Grill in Noblesville, IN.

Here are the positive results using the Vulcan system:

- The Vulcan immediately solved a problem with our restroom water fixtures.
- The Vulcan eliminated our water softener, along with the required salt and water consumption.
- The Vulcan drastically reduced our dishwasher soap usage.

With this environmentally friendly product, the above savings resulted in a return on investment within 6 months.

Sincerely,

A handwritten signature in black ink that reads "Scott Wolf".

Scott Wolf  
Owner, Wolfies Waterfront Grill



Wolfies WaterFront Grill Restaurant, Noblesville  
Noblesville, Indiana 46062



## Waffle House Restaurant

USA



### Installation details

Model: Vulcan S25

Location: Waffle House  
Tallahassee  
Florida

Installation area: Water main

Installed by: Ackruitlabs, Inc.



## Fazer Chocolate Production Factory

Finland

# Fazer Chocolate



**Location:** Fazer  
Konsernijohto  
Fazerintie 6, Vantaa  
PL 4  
00941 HELSINKI

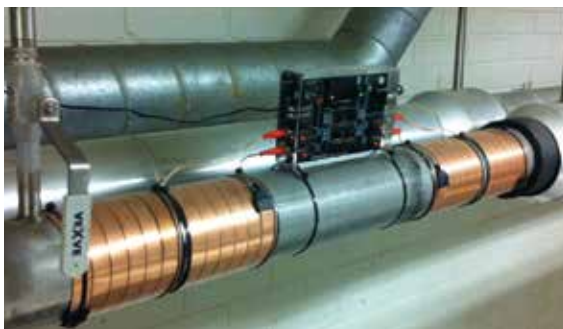
**Installed by:** Vesitekno Oy  
Ylästöntie 121 A  
01740 Vantaa  
Finland  
[www.vesitekno.fi](http://www.vesitekno.fi)

### Fazer confectionery

Fazer is Finland's leading confectionery company and one of the leaders in the Baltic Sea region and Russia. The company was originally founded by Karl Fazer in 1891, as a "French-Russian conditory" in central Helsinki.

In the confectionery business, Fazer is the market leader in Finland and a strong player in the Baltic Sea area, exporting products to more than 40 countries. Among Fazer's strong international brands are Karl Fazer, Geisha, Dumle, TuttiFrutti, Xylimax, Marianne, Tyrkisk Peber, Pantteri and Ässä.

Fazer's confectionery factories are located in Finland, and this is where the Vulcan S25 unit has been installed. This unit has been placed on the cooling system, used in the production of chocolate.



### Model installed:

Vulcan S25

### Installation area:

Cooling system used in the Fazer chocolate production factory in Helsinki



### Fazer Factory:

Aerial shot of the Fazer chocolate production factory in Helsinki

# Grand Traverse Distillery

USA



## Details of Installation

Model: Vulcan 3000

Location: Grand Traverse Distillery  
Traverse City, MI 49686

Area of installation: Inlet water main

Installed by: Salt-Free Water Systems LLC  
1429 Casco Bay Cir.  
Cicero, IN 46034  
[www.vulcan-usa.com](http://www.vulcan-usa.com)



Vodka Distillery



Grand Traverse Distillery



Scale deposits removed after installing the Vulcan 3000

## K & P Zimmermann Cheese Dairy Production

Switzerland

K & P Zimmermann  
Cheese Dairy  
2333 La Ferrière  
032 961 11 53

**CWT International**  
**Mr. W. Kurt**  
**4103 Bottmingen**

**La Ferrière**

**CWT Vulcan S25 - 3 months-test in the cheese dairy and apartments of K & P Zimmermann in La Ferrière in Switzerland**

The chrome pipes have visibly less scale deposits and it is much easier to clean them - just with a damp cloth and no chemicals are needed. Also in the pans, the scale doesn't attach so much and it is easy to remove.

One month after the installation of Vulcan S25, we made a test with a rusty nail. After two weeks the nail was clean.

Summary: For us Vulcan is the easy solution against scale and rust and keeps our piping system and appliances clean. We need less maintenance and save money with it.

Best Regards  
K. Zimmermann





## Delice Danone Dairy Production

Tunisia



### Installation Details

Model:	2 x Vulcan 3000
Location:	Delice Danone Usine Tunisia
Installed by:	STPE sarl Tunisie

### Delice Danone Factory - Tunisia

The Fresh Dairy Products division manufactures and sells dairy products and other fermented dairy specialties. In this context, Danone relies on its ability to develop its range and continuously introduce new products in terms of flavor, texture, ingredients, nutritional content or packaging. Their brands include Activa, Oikos Greek yogurt & Danone children's yoghurt.



Milk production



Milk production



Vulcan 3000 installed in the Delice Danone factory



Vulcan 3000 installed in the Delice Danone factory

## Fritz Häcker Gelatine Production

Germany

Fritz Häcker GmbH + Co. KG . Postfach 1265 . D-71655 Vaihingen/Enz

To  
Christiani Wassertechnik GmbH (CWT)  
Attn. Mr. Cedric Christiani  
Köpenicker Strasse 154

10997 Berlin



### Water Treatment System VULCAN

Dear Mr Christiani,


We are a company in the adhesives industry originating from the production of gelatin. Traditionally a high amount of water is required for the extraction process to produce gelatin. For this we have our own deep wells from which the required water is drawn. Due to the area's geology, the ground water is relatively hard which inevitably results in thick layers of adherent limestone in the tanks. Some of which only were removable by using chemical substances. The water heater was also subject to relatively quickly calcification.

To remedy this, we have already taken one of your Vulcan systems into operation in the central hot water supply. We were stunned by it's results, especially as the opinion about this kind of water treatment systems is very much divided.

The physical treatment of the water by Vulcan caused a significant reduction of adherent limestone in the tanks and piping surfaces. Decalcification actions had to be executed in considerably larger intervals, which results in considerable lower costs.

We are convinced of the viability of these systems and can only find words of praise for the service given. On this basis, we will certainly continue to work together.

Best regards

  
Fritz Häcker GmbH+Co.KG  
General Management  
Klaus Bohne

## Marcel SINAI "Les Aires" Olive Oil Production

France

**Marcel SINAI**  
" Les Aires "

Route du Destet - Quartier des Calans  
13520 MAUSSANE LES ALPILLES

CWT  
Köpenicker Str. 154  
10997 BERLIN  
Germany

**Reference: 12102680 Vulcan 5000**

Dear Sirs,

I purchased this unit at the BATIMAT trade fair in Paris under the reference 21623.

The Vulcan descaler model is installed and is functioning correctly as we no longer have traces of limestone on our ro-binneterie GROHE stainless steel. The water in our region (la Provence) is particularly limestone rich.

Best wishes.

Marcel SINAI



Producer of olive oil



# Grease Trap in a Food Factory

Japan

**Grease trap measures**  
in a food factory

Installation example

Dear CWT Team,

The Vulcan unit has a trouble free design and easy installation. The LED light always blinks dependably as it shows the processing conditions.

I have compared the state of the grease trap before and after installing the Vulcan. Before installation, I noticed strong odors when opening the hole. When I opened the hole a month after installation, no such odors were present.

As for the cleaning intervals, monthly cleaning may now not be required.

The effect and cleaning intervals of Vulcan will require an annual observation, however, I believe the amount of cleaning will be reduced remarkably.

Regards,  
Factory Manager



Before Vulcan installation



3 months after installation - grease is more consistent and less cluttering



## Bigard Meat Factory

France



[www.bigard.fr](http://www.bigard.fr)



**Vulcan installed at:**  
BIGARD Meat Factory  
France

**Installed by:**  
CWT Preval France

**Model installed:**  
Vulcan S25

### BIGARD Meat Factory

Bigard Group is the leading meat processor in France (processing more than 500,000 tonnes per year).

The Vulcan S25 device has been installed on the machine responsible for washing the white containers which have barcodes located on the side.

Before installing the Vulcan unit, the scanning machine could not read barcodes due to scale incrustations. Now after installed Vulcan, the machine is able to read these bar codes correctly. Bigard is now saving on maintenance costs and reduced time spent on cleaning the washing machine and white boxes.



Washing machine used for the white containers



White containers and barcodes are now free of scale



Vulcan S25 unit installed with insulation re-wrapped over the pipes and impulse cables

## Eberswalder Wurst Sausage Production

Germany

### EWG Eberswalder Wurst GmbH

*Eberswalder ... Richtig gut die Wurst*



EWG Eberswalder Wurst GmbH  
Christiani Wassertechnik GmbH  
Heinrich-Heine-Str. 15  
52249 Eschweiler

Dear Sir,

We have been using your Vulcan-Impulse-Technology for over a year with great success.

Despite the use of chemicals during the pasteurisation of vacuum-packed sausages such as hard water stabilizing agents and corrosion inhibitors, heavy scale deposits accumulated in the pipes and the holding tanks which could only be cleared through intensive chemical purification several times throughout the year.

Six months following an intensive purification and the installation of your Vulcan technology, only very few deposits in the warming zone and none at all in the cooling zone could be found.

These deposits need now only to be cleared once a year at a considerable lower cost.

We wish you further success with your technology against scale and rust

  
Helmut Schwendler  
Director of Engineering



Sausage packaging line



Vulcan S25



Mr. Christiani at installation of Vulcan

**Hotels**  
**Apartment Buildings**  
**Spas and Wellbeing**



## Royalton Punta Cana Resort & Casino

Dominican Republic

**Location:**

Memories Splash Punta Cana  
Punta Cana, Dominican Republic  
[www.grandparadisebavaro.com](http://www.grandparadisebavaro.com)

**Installed by:**

InterClima

**Models installed:**

2 x Vulcan S500  
1 x Vulcan S100



Aerial view of the Memories Splash Punta Cana

**Application:**

The Royalton Punta Cana Resort & Casino is a 1000 room resort located on the beachfront in Punta Cana, Dominican Republic.

Two Vulcan S500 were installed on the main input pipe in order to combat scale build up and increase efficiency of the three cooling towers.

A Vulcan S100 is also installed on the resorts main hot water system, in order to remove and prevent scale build up in the heaters/boilers, which provide hot water throughout the entire resort and casino.



Vulcan S500 protective casing



Vulcan S500 cable windings



## Karnavati Club Hotel

India



### **Karnavati Club Hotel in Ahmedabad, India**

A prestigious name known among the most known clubs and recreational organizations of Ahmedabad is **The Karnavati Club**. The club, with an area of 500,000 sq.feet is located on the Sarkhej-Gandhinagar Highway. The club was established in 1989. And today, it is an ultimate success in the arena of recreational clubs.

**Installed:** 1 x Vulcan S100 for swimming pool  
1 x Vulcan S100 for the utility

**Installed by:** [BENCHMARK Agencies PVT Ltd](#)



Two Vulcan S100 were installed.



Salt based softener is replaced by Vulcan S100.



## Hotel Meridien N'Fis

Morocco

Hotel Méridien N'fis  
Avenue Mohamed VI,  
Marrakesh 40000,  
Morocco

[www.lemeridien.com](http://www.lemeridien.com)

*Le* **MERIDIEN**  
N'FIS

### Certificate of reference for the Vulcan Descaler

In order to remove and prevent scale and rust issues affecting our pool areas and various hydraulic installations, we have purchased and installed the Vulcan S25 unit from CWT International.

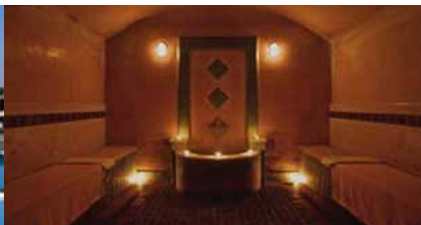
After receiving a very satisfactory result from the Vulcan S25, we plan to entrust the Vulcan Descaler range with any future scale or rust problems in the Le Meridien N'fis.



Hotel Méridien N'fis pool and spa area protected by Vulcan S25

Kind Regards,

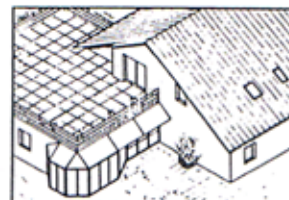
A Moursil.  
Technical Director.



## Hotel Cadolzburg

Germany

### HOTEL-KURBAD ZUM WASSERHAUS CADOLZBURG



Christiani Wassertechnik GmbH  
Heinrich-Heine-Str. 15  
52249 Eschweiler

#### Your water treatment device Vulcan 5000 four week test

With this letter I would like to give you some insight into our experience with your water treatment system.

We have a water hardness level of around 280 ppm in Cadolzburg and as we have a spa, we use a great deal of water and have always had problems with limescale and calcification.

To get rid of this problem, we have already used two different types of devices from other manufacturers whose systems work according to a design similar to yours. As these both failed, we had to take out both products.

When we saw how simple your system is, we were honestly fairly skeptical and even more so when we saw how your technician installed the product on our entry pipe in minutes with no tools. Still after only a few days we noticed a clear difference in the calcium levels. Where there were previously hard calcium deposits that had to be removed with cleaning fluids, now we saw just a light white film that could easily be removed. We also saw that shower heads and water pearling devices no longer showed signs of calcification.

We will, without a doubt, keep the Vulcan 5000 and attached is our check. Furthermore, I wish you great success in providing others and wish your company all the best.

Sincerely



Mitglied im  
Verband Physikalische Therapie,  
staatl. gepr. Masseure und med.  
Bademeister



**BAYERISCHER  
HOTEL-UND GASTSTÄTTEN  
VERBAND E.V.**



## No9 Dacheng Road Hotel

China



### No 9 Dacheng Road Hotel

No.9, Dacheng Road, Fengtai District, Beijing, China

#### Installation details

**Model:**

Vulcan S100

**Installation Location:**

No 9 Dacheng Road Hotel  
Beijing, China

**Application Area:**

Hotel Bathing

**Installed by:**

Beifangxinhu



**Application:**

The No 9 Dacheng Road Hotel is a 375 room, 16 storeys high hotel located in centered Beijing, China. It is a hotel for tourism, leisure, and business.

A Vulcan S100 was installed on the hotel main hot water system, in order to remove and prevent scale built up in the heaters/boilers, which provide hot water throughout the entire hotel for bathing.



Vulcan S100 installed in the hotel in Beijing, China



Detecting the Vulcan impulse field



## Hotel Mercure Munich

Germany

Leopoldstr. 120 • 80802 Munich • Germany

CHRISTIANI Wassertechnik GmbH  
Heinrich-Heine-Str. 15  
D-52249 Eschweiler



**Re: physical water treatment unit Vulcan S100**

Munich

Dear Mr. Christiani,

We are pleased to inform you that the water treatment unit has been working perfectly and to our full satisfaction ever since its installation.

Only a short time after that we observed that we no longer needed acetic or absorbic acid in order to clean the showers and shower heads in our hotel, which has more than 65 guest rooms, since the scale that builds up now is no more than a layer which is easy to wipe off. Due to the fact that the efforts employed at maintaining the sanitary facilities can be kept to a minimum, and resulting from the smaller electricity consumption, we are able to economize. Simultaneously, we also make an active contribution to environmental protection by renouncing on aggressive cleansing agents.

We are glad to own a water treatment unit that is compatible with the environment and which renders the optimum output at low running costs (approx. 10 € on electricity costs/year). Moreover, this unit has finally provided us the solution to a problem we had been confronted with day by day and which was difficult to put up with.

Given our satisfaction it will always be a pleasure for us to recommend your company and your product to other clients.

Sincerely yours,

Horst Schneider  
Director

## Design Hotel Q!

Germany

**Q! Hotel - Knesebeckstr. 67 Berlin**

CHRISTIANI Wassertechnik GmbH  
Heinrich-Heine-Str. 15  
D-52249 Eschweiler



**Re: Letter of recommendation from Hotel Q!**

Dear Mr. Christiani,

It is a pleasure for us to inform you that we have been very satisfied with the Vulcan descaling unit with which you have supplied us.

As we are engaged in the hotel business and committed to cleanness, doing our best endeavors to combat lime-scale is all the more important to us. In respect with the daily cleaning of the guest rooms as well as the hotel facilities in general it is of paramount importance to maintain a high level of cleanliness, and the unit you have provided us with helps us a lot to attain this goal.

The Vulcan S25 unit makes the daily cleaning of our hotel facilities easier and also allows us to save a lot on cleansing agents for it is no longer necessary to use as much of them as we used to before.

I would like to single out for praise the fact that the scale converted by this device no longer settles on fittings and panes of glass as it usually did before. Which enables us to maintain showers and fittings free of lime-scale without any trouble.

Therefore, our hotel will gladly recommend this unit to other clients. We would also like to thank you for granting us a trial period to test your device.

Yours sincerely

Gordon Deckelmann  
Technical Director/ Maintenance

## Sage Hills Motel

USA

Quest Green Solutions  
The Vulcan Descaler  
P.O. Box 6662  
Santa Rosa, CA

## Sage Hills Motel

To the Quest Team,

We have sent you this letter to advise results after purchasing the Vulcan 5000 from your office. We are an 18-room motel located in the town of Cache Creek, British Columbia, Canada; approximately 4 hours drive north east of Vancouver, B C.

We purchased your product due to the continuous hard water problems related to cleaning issues and hard water build-up. Our most obvious problems were in our bathrooms where we found after a few years it became impossible to remove hard water build-up on and along and close to the caulking areas of bathtubs and the surround shower walls. We found that after 3 or 4 years we would have to replace the surround shower walls.



The toilets constantly had waterline and water fall stain build up in the bowl, the bathtub and bathroom sinks and taps also displayed hard water stain. Our guest room water glasses despite putting them through a dishwasher would not come clean, typically they would display blotching or drips drying with mineral build up. Our white linens did not stay "clean white" for long and displayed a darkened white after a couple of months.



Our hot water tanks and hot water copper lines continuously had to be unsoldered at elbows and joints every few years to clean out the scale- encrustation build-up as the water pressure to the rooms lost pressure.

When we first had a look at the elbows we were horrified to see just a little more than a pinhole in some of the water lines getting through. Our guest room kettles had a build up of minerals that were obvious to the point where we would have to have to flush them out on a regular basis.

**Upon purchasing the Vulcan 5000 the first thing we noticed was that it really was easy to install with no hidden surprises. Within a few days we noticed that the guest room water glasses were truly sparkling clean, no blotching, all crystal clear. We were very happy with this result. The chamber maids have reported back that the taps and faucets are easier to clean and I must say they do appear shinier and clean, although we expect as time goes by they will become cleaner and newer looking.**

The blotching in the tubs and surround walls has improved all though the best test will be to see what happens in a year from now and on new installs. Although its difficult to tell at this early stage we assume the lines will start clearing over time given the results we have seen so far. Typically the signs of severe hard water build-up start with turning on a tap in our laundry room and after a short period without adjusting the tap flow, the flow gets less and less. We then start the process unsoldering and cleaning out the pipes manually. We expect this process will now not be required. We have had the Vulcan 5000 in place now for just a short period of time (month and one half) and are definitely pleased with the quick results so far.

Sincerely,  
Hal and Karen  
Sage Hills Motel

## Apartment Building

Japan

### Installation of Vulcan S25



Installation site: The roof of an apartment building in Tokyo. (Building built 20 years ago with 46 apartments)

Water supply system: Water tank on top of the roof

Piping diameter: 80mm

Model: Vulcan S25

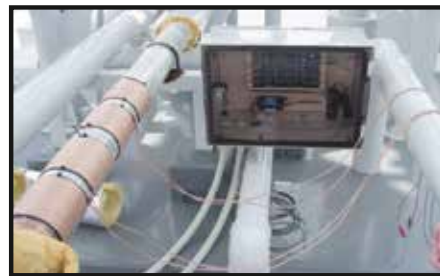
Water treatment capacity: 25 m<sup>3</sup>/ hour



Before Installation: The cover and the lagging material on the pipes are removed for installation



Cable windings complete



Impulse cables and the Vulcan S25



The piping with cable has now been recovered with the lagging material and cover. Installation of the Vulcan is now complete.

## Apartment Building

France



[www.sarthe-habitat.fr](http://www.sarthe-habitat.fr)

### Installation details

**Model:** Vulcan S25

**Location:** Sarthe Habitat  
58 Avenue Bollée  
72000 Le Mans  
France

**Installed by:** CWT Preval France



Vulcan S25 installed in on the heating system for 132 apartments

### Sarthe Habitat

Sarthe Habitat is responsible for the construction and management of housing developments for the elderly, disabled and disadvantaged youth. Each construction integrated into Sarthe Habitat has a strong focus on urban planning with compliance and commitment to sustainable development. In total, Sarthe Habitat manages 13,891 homes, 22 businesses and 43 apartment buildings.



Vulcan S25



Sarthe Habitat 132 apartment complex in France



CWT Preval France, 2 Rue de la Gare, 72170, Beaumont Sur Sarthe, France, [www.cwt-international.com](http://www.cwt-international.com)

# Spring Lake Village — Retirement Home

USA



Spring Lake Village - Retirement Home

Santa Rosa, California

CWT  
 Distributor: Quest Green Solutions  
 Santa Rosa, California  
 USA

Location: Spring Lake Village  
 Santa Rosa, California  
 USA

Model: 2 x Vulcan S25

Installation area: Main water inlet - Health centre  
 Main water inlet - Building E



Vulcan S25



Vulcan S25 installed in Building E at the Health Center



# MeridianSpa Berlin

Germany

## Vulcan S250 Installation MeridianSpa in Berlin, Germany



**Location:**  
Meridian Spa,  
Berlin

**Installation:**  
CWT Germany

**Model:**  
Vulcan S250

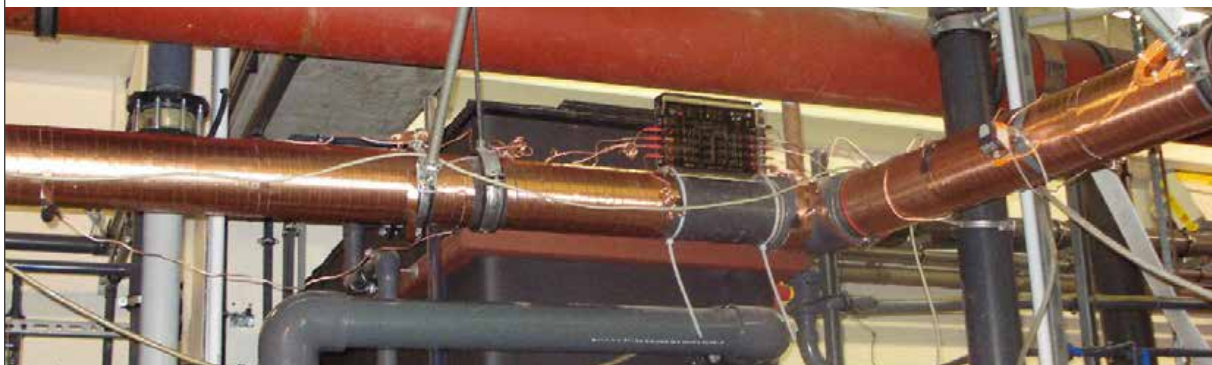
**Application:**  
Pool and spa area



Pool and spa area protected by Vulcan S250



Vulcan S250 treating main water pipes for the Meridan Pool and Spa area



**Schools**  
**Educational Institutions**  
**Sporting Facilities**





## University of California Davis — Bodega Marine Laboratory

USA

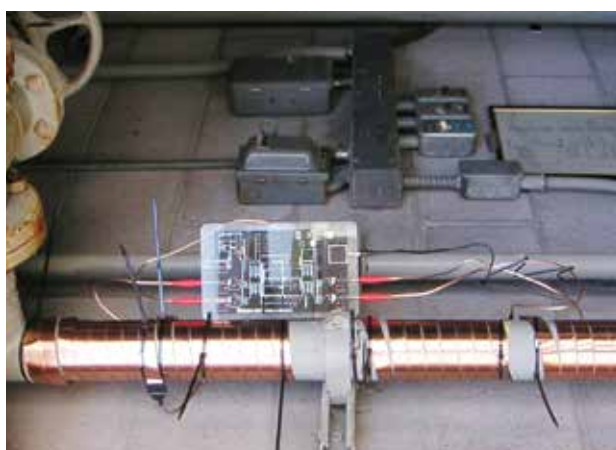


UCDAVIS Bodega Marine Laboratory  
2099 Westside Rd,  
Bodega Bay  
CA 94923



Vulcan S10 installed on water main for Bodega housing dormitories

Model: Vulcan S10  
Installation Area: Water main of the Bodega marine housing dormitories  
Installed by: Quest Green Solutions



Vulcan S25 installed on cold water pipe for the Bodega marine laboratory

Model: Vulcan S25  
Installation Area: Cold water pipe of the main Bodega Laboratory  
Installed by: Quest Green Solutions

## Florida State University — Biomedical

USA

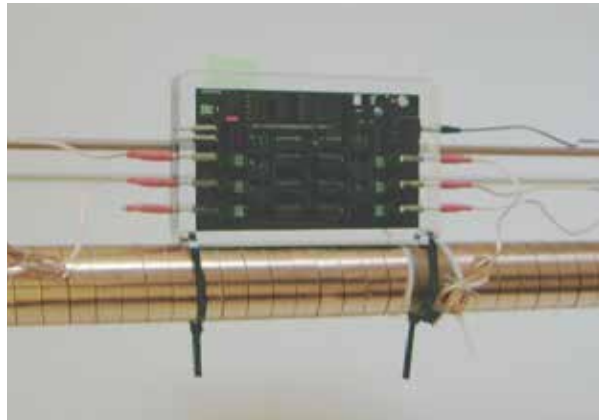


### University Of California Merced

5200 Lake Rd,  
Merced  
CA, 95340

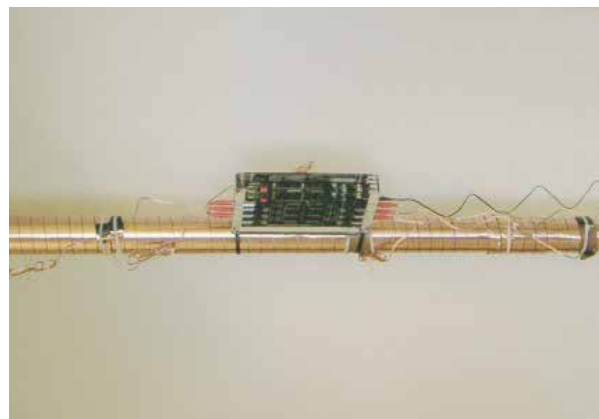
CWT  
Distributor: Quest Green Solutions  
P.O. Box 6662  
Santa Rosa  
California  
USA

Location: University Of California  
Merced, California



Model: Vulcan S100

Installation  
Area: Installation of the Vulcan  
S100 on the main cold  
water line



**UC MERCED**  
UNIVERSITY OF CALIFORNIA,

# University of California Merced

USA



**Florida State University**  
**600 W. College Avenue**  
**Tallahassee**  
**FL 32306**

Dear Ackurilabs Team,

Please find below photos of the Vulcan Descaler installed in the Florida State University Biomedical Facility.

These pictures are of a stainless steel rack washer and conveyer steam washer, after the Vulcan units were installed on the entire Biomedical Research Building.

Regards,

The Florida State Bio-medical Team



Vulcan unit installed on water main



Stainless steel rack washer now completely scale free



Conveyer steam washer



## Beijing University of Chemical Technology

China



# 北京化工大学

Beijing University of Chemical Technology

Dear Christiani Wassertechnik GmbH (CWT),

Due to the shower head scaling problem in Changping student dormitory in Beijing University of Chemical Technology, the water was getting reduced after a month, and the shower head was blocked completely after two to three months. The scale was very hard, so we even had to use the 1.8mm driller to remove it. In addition, the drinking water heater in the student dormitory was scaled badly, two heating elements were completely scaled and no longer useful after one semester, we had to hire cleaning workers regularly, and the damage rate of heating elements was extremely high.

When I saw Vulcan products introduced by your distributor-Beijing North Xinqu Mechatronics Co., Ltd, we doubted if such a simple product could solve our scaling problem. Let's try and see.

We installed 2 Vulcan to test: one S25 for shower heads in the student bathroom; one S10 for heating elements of drinking water. After 2 months, no scale was found on the shower heads, only saw a thin layer of white membrane, and it was easy to remove. Also, the scale of heating elements were significantly reduced, Vulcan greatly extends the time of manual cleaning.

Through this test, we are very satisfied with Vulcan products with no doubts. Strongly recommended!

Kind regards,

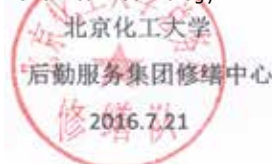


Vulcan S25 for solving the shower head scaling problem.



The student dormitory of Beijing University of Chemical Technology.

**Repair Service Center**  
Beijing University of  
Chemical Technology



After installing Vulcan for 2 months, the scale of shower head has been reduced.



## Irrigation for a Football Field

Saudi Arabia

### Irrigation water for the natural grass football fields



Dear Mr. Christiani,

Reference to the above mentioned subject, we have installed VULCAN S100. After a year, the result on irrigation water for the natural grass football fields was very satisfactory.

The company which is behind the maintenance of football fields feeling well, they have sent reports to the Saudi Government Sports Ministry they wrote on their reports that there's good result on using this devices.

Engr. Ziad Sabbagh





## Hartwall Ice Hockey Arena

Finland



HARTWALL AREENA  
Helsinki Halli Oy  
Areenankuja 1, FIN-00240 Helsinki

Hartwall - Arena  
Areenankuja 1  
FI-00240 Helsinki,  
Finland

CWT-Christiani Wassertechnik GmbH  
Herr Rolf Christiani  
Köpenicker Str. 154  
10997 Berlin



Dear Sir

We have been using CWT-Christiani Wassertechnik GmbH Vulcan water treatment equipment in our ice hockey hall Hartwall Arena.

We are using many sizes of Vulcan for several heating/cooling equipment in our water system:

- Vulcan 5000
- Vulcan S 25
- Vulcan S 100.

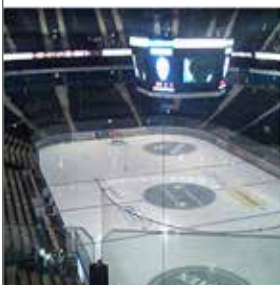
We have realibility with these systems and have been most satisfied in using them.

Vulcan is a high-quality and great solution to different kind of premises.

Yours sincerely,

Hartwall – Arena

  
Jari Väinänen



## Ice Land Stadium

USA



### Installation details

Model:	Vulcan S25
Location:	Ice Land, New Jersey
Installation area:	Treats water used for ice production
Installed by:	Princeton Management Advisory and Consulting LLC



Vulcan S25 installed at Ice Land, New Jersey



## Terrassa Sports Centre

Spain



Vulcan Spain  
C/ Ample, 45 Bajos  
08225 Terraasa

Dear Mr. Mio,

We have installed the Vulcan descaling device at the Salobreña sports centre in order to combat the various limescale problems and to ensure the preservation of this sporting facility. This facility has a 25m long swimming pool, as well as a full gymnasium with all types of weight machines, treadmills, ellipticals and stair masters.

I am happy to report that we have seen excellent results after the Vulcan installation, and we are sincerely happy for the great service provided by Vulcan Spain.

We are now studying the feasibility of installing the Vulcan Descaler at the other council building and facilities in Terrassa.

Thanks



Miguel Castaño Gonzaley  
Manager of Tourism and Sports in the City of Salobreña

## RM Fitness Centre

Spain

### RM FITNESS CENTRE

VULCAN ESPAÑA  
TERRASSA-BARCELONA

To Vulcan Spain,

Since we installed the Vulcan S25 in our facilities, according to our customers and maintenance managers, we have significantly noticed the effectiveness of Vulcan in our facilities.

We have noticed the descaling of the pipes, reduced scale in the boilers/appliances and a significant saving in chemicals and electricity costs.

The skin and hair feels softer, and we have reduced the cost of cleaning products.

Electricity costs are much lower because Vulcan annual consumption is very low.

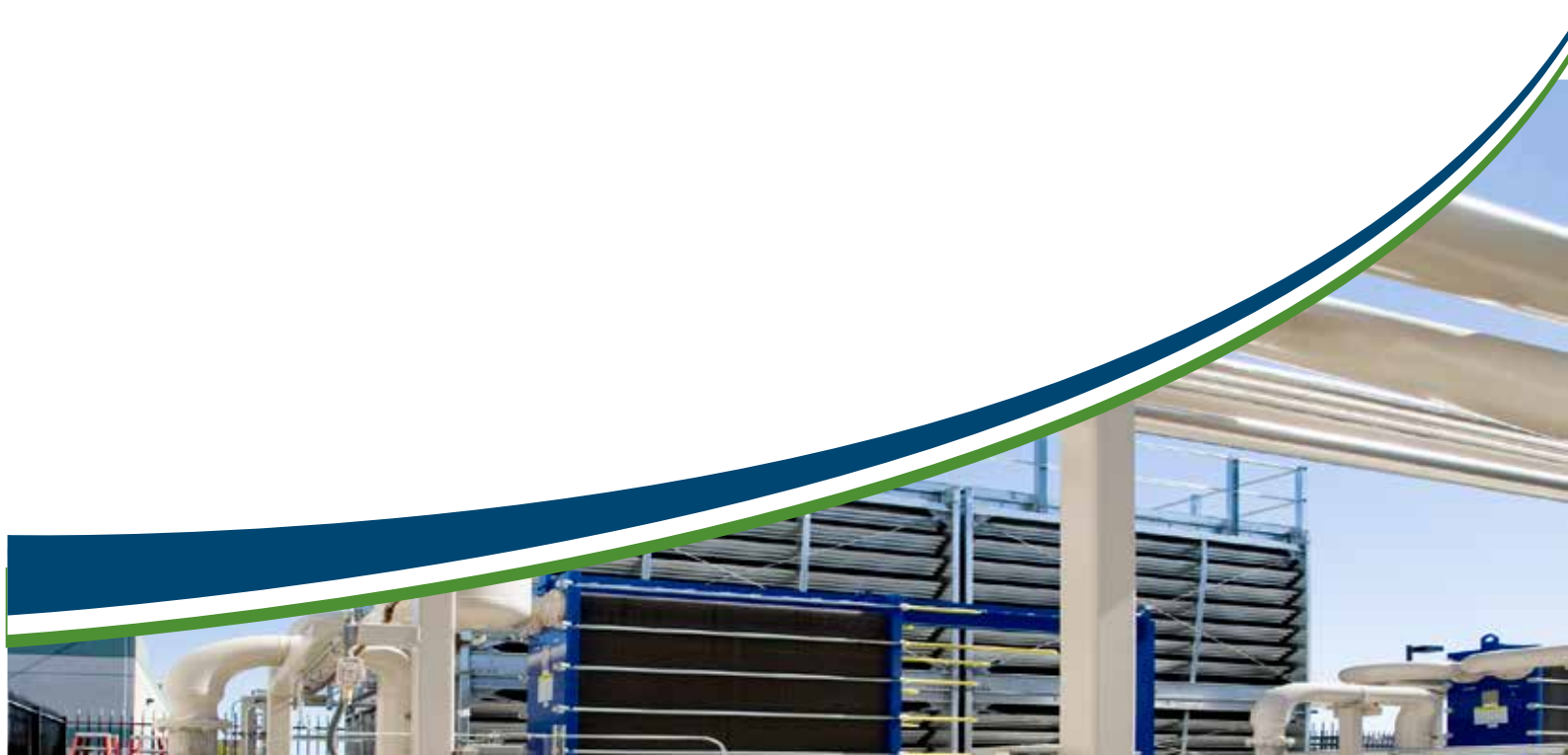
We removed the conventional softener we had since the opening of the gym, thus saving expenses of salt and water.

Therefore we want to congratulate Vulcan Spain for the right solution that you have brought to us to solve the problem of lime in the water.

Ernesto Betancourt.



**Cooling Towers**  
**Chillers**  
**Heat Exchangers**





# Florida State University — Engineering

USA

<p><b>Florida State University</b>  <b>600 W. College Avenue</b>  <b>Tallahassee</b>  <b>FL 32306</b></p>		
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To the Ackurtilabs team,

Please find below photos of the Vulcan Descaler installed in the Florida State University College of Engineering.

These pictures show 2 x Vulcan S100 units protecting the double chiller and pumps in the FAMU/FSU College of Engineering.

Regards,

The Florida State Engineering Team



Vulcan S100 units installed on the double chiller



Vulcan S100 units installed on the double chiller



Vulcan units protecting chiller pumps from scale and rust

# Spokane Public Schools Washington

USA



## Vulcan installed in Spokane Public Schools

Dear CWT Team,

Spokane schools now have 6 Vulcan units installed.

One of the first Vulcan units is on a small cooling tower and this stays absolutely clean during the season. The tower was full of scale when we started and after 4 weeks, scale started to fall off in big chunks and now it is completely scale free.



Installation of Vulcan Descaler for the entire buildings water supply in the Roosevelt school

Our first installation in Spokane schools was in Shaw Middle School, 50 years old building and with rusty/dirty looking water.

This was installed before the school started in the fall. After Christmas this year, the water is always clean and the janitor does not have to flush the piping anymore.

Have a great day.

Arne Vestad  
IWTNA

### Installation locations



#### Roosevelt Elementary School

333 West 14th Ave  
Spokane, WA 99204-3627  
USA



#### Shaw Middle School

4106 N. Cook St.  
Spokane, WA 99207  
USA

# Barceló Bavaro Palace

Dominican Republic



The 5-star Barceló Bávaro Palace hotel is one of the top luxury hotels in Punta Cana, designed specifically for people who love constant sunshine, the gentle sound of the Caribbean breeze whispering in the palm trees, and beautiful crystal-clear waters with a coral reef. The hotel is beside one of the 10 most stunning beaches in the world.

### Installation details

- Location:** Barceló Bávaro Palace  
La Antagracia, Dominican Republic  
[www.barcelo.com](http://www.barcelo.com)
- Models:** 2 x S100 in hotel's main hot water lines  
3 x S250 for cooling towers  
4 x S500 for cooling towers
- Installed by:** InterClima

### The results

The project began with a mechanical room energy audit resulting in a great opportunity to upgrade the existing equipment with a very short payback period. The original installation was sold with an estimated payback of less than 2 years. To our customer's happy surprise, the actual payback was 9 months! The hotel maintenance manager is very impressed with the performance of the Vulcan systems, this opened up many additional opportunities including the subsequent chiller and cooling tower replacements.

Before Vulcan S100 was installed in hotel's main hot water line, the storage tanks had a solid 3 cm thick scale layer inside them and the pumping pressure from the booster set was at maximum while being unable to deliver adequate water pressure to the end of the line hotel rooms. After the 3 months period, an inspection of the inside of the storage tanks revealed that the scale layer was soft allowing them to mechanically clean them removing most of the calcium deposits. Other the following 12 to 18 months, the distribution lines also cleared up resulting in much improved flow and lower pumping costs from the booster sets.

The manager was instrumental in the approval of the recent trial installation of an S250 in the Royalton White Sands (Jamaica). We will continue to use the Barceló success in our future presentations.

### Installation purpose

Most of the hotels in the area of Bavaro/Punta Cana in eastern Dominican Republic depend on ground water wells for their domestic water supply, using traditional water softening equipment to reduce the scale and hardness of the water. The fact is that some of these resorts have very poor maintenance resulting in extensive scaling of cooling towers and domestic hot water piping and equipment.



3 chillers were treated by 3 Vulcan S500



Aerial view of Barceló Bávaro Palace next to the Bavaro beach, Higüey



## Yuqiao District Heating Station

China

### Yuqiao District Heating Station

**Model:** Vulcan S100  
**Location:** Yuqiao district heating station  
**Installed by:** Dalian Jiayifang  
**Installation reason:** to solve the scaling problem of heat exchanger in the heating station



Scale can be easily wiped off, and the pipe shows the smooth wall

Yuqiao district is located in Dalian city, with in total about 160,000 square meters, 1300 households and 3900 people.

Yuqiao district heating station is responsible for heating the entire district. The heat exchanger was scaled badly, so heat transfer efficiency was reduced, also affected the heating quality.

After Vulcan was installed for only one month, it already shows very good result: the scale in the valve before the heat exchanger can be easily wiped off, and the inner wall becomes smooth again.



Vulcan S100 was installed on the main circulation water supply, which is from the municipal water.

## Air Conditioner

China



**同程旅游**  
Tong-Cheng Travel

### Installation Location:

the headquarter building of Tong-Cheng Travel  
(Suzhou City, Jiangsu Province, China)

### Installed by CWT distributor:

Jiangsu Xinriyuan Construction Energy Saving  
Technology Shareholding Co., Ltd.

### Model:

1 x Vulcan S100



the headquarter building of Tong-Cheng Travel in  
Suzhou city, China

### Installation application:

Tong-Cheng Travel is a Chinese tourism leading enterprise, CWT distributor- Xinriyuan took charge of the whole building air-conditioning works. The main part of the air-conditioning uses high efficiency evaporative system, and it requires very high quality water. To ensure the long-term efficient operation of the heat exchanger and also to avoid scaling occurred, Vulcan S100 was bundled with air-conditioning evaporative system.



main air-conditioning system



Installing Vulcan S100



Vulcan S100 was installed on the main air-conditioning system



## Neptune Seafood Restaurant

USA



**Vulcan installed at:**

Neptune Foods - Vernon  
Seafood processing  
90058 Vernon  
California, USA

Arne Vestad - International Water Treatment North America

Dear CWT Team,

This cooling tower is one of three protected by the Vulcan S25 units in this location. The building is one of 47 buildings owned by Neptune Foods in Vernon LA, and this particular building does mainly seafood processing and packaging for consumers.

This picture was taken after 4 months the installation of the Vulcan S25. The tower was dirty/not cleaned before the Vulcan was installed.

Since the Vulcan installation, the cooling towers have been scale free and there has been no need for any chemical treatment.



Clean cooling tower after using Vulcan

Best Regards,  
Arne Vestad

# Commercial Cold Storage

USA

## Commercial Cold Storage



1011 S 1st St,  
Mt Vernon  
WA 98273  
USA

IWTNA  
2607 Bridgeport Way West  
Suite 1J University Place  
WA 98466

Dear IWTNA,

Please find below the installation photos of the Vulcan S100 installed on the main line connected to 3 cooling towers.

Regards,

The Mt.Vernon Cold Storage Team

[www.commercialcold.com](http://www.commercialcold.com)



Vulcan S100 installed on cooling towers



Vulcan S100 installed outside



"...serving the global food industry."

## Water Wise Cooling Towers

USA



Dick Van Voorhis  
Salt-Free Water Systems  
1429 Casco Bay Cir  
Cicero IN 46034

**RE: Vulcan Descaler as an alternative to chemical based cooling tower treatments**

Dear Dick,

For the past two years, we have selected several of our existing customers and offered them the opportunity to have us install the Vulcan Non-Chemical Unit on their cooling towers, for the purpose of evaluating corrosion, scale and bacteria rates versus a traditional chemical treatment program.

We have installed 5 x Vulcan S25 & 2 x S10 units all in the upper New York State area.

Based on standard water test analysis, including Corrosion Coupon Testing and regular Bacteria Dip Slide results, we have concluded that the Vulcan Non Chemical System has been able to provide similar results, to those achieved using a chemical based treatment program.

Regards,

Michael Bromley  
President  
Water Wise of America Inc.  
Rochester NY 14624

[www.waterwiseofamerica.com](http://www.waterwiseofamerica.com)

## Chillers in a Cooling Tower

USA

INTERNATIONAL WATER TREATMENT  
N O R T H A M E R I C A  
*Clean, Green, Affordable*

### Vulcan installed in a Chiller

Dear CWT Team,

Here are two pictures from a Chiller opened for a routine cleaning, but nothing to clean after two years with Vulcan treatment.



No scale formation after using Vulcan



This Chiller is connected to a Cooling Tower which is exposed to lots of air borne contamination from surrounding farms.

Best Regards

Arne Vestad  
[www.IWTNA.com](http://www.IWTNA.com)

## Dynamit Nobel Dynamite

Germany

# Dynamit Nobel

AKTIENGESELLSCHAFT

WERK LÜLSDORF

DYNAMIT NOBEL AG, Werk Lültdorf, 5216 Niederkassel

Firma  
Christiani Wassertechnik GmbH  
Diepenbenden 25  
5100 Aachen

Water treatment device

Dear CWT-team

Currently we have five devices from the Vulcan range in use.

Because of the high degree of hardness of our cooling tower water, we had to decalcify every few months. After we used the devices, the scale on the heat exchange pipes was drastically reduced. Thus the lifetime of these devices is getting longer.

Kind regards

DYNAMIT NOBEL AG  
Werk Lültdorf  
Technical Department

The image shows two handwritten signatures in blue ink. The signature on the left is stylized and appears to be 'Fey'. The signature on the right is more legible and reads 'Wilmer'.



## VacMet Coating & Engraving Service

USA



**Coating & Engraving Service**

Coating of metals with plastic or resins

IWTNA  
Arne Vestad  
2607 Bridgeport Way West  
Suite 1J University Place  
WA 98466

### **Vulcan anti-scale system**

Dear Mr. Vestad,

I have noticed a definite improvement in the operation of our boilers. Typically, we would have several cooling coil plug ups during the hot weather season (a greatly extended season this year) and since the installation of the Vulcan, we have had zero plug ups and that translates into the saving of many hours of down time.

Based on that saving alone, the Vulcan has already paid for itself.

An additional benefit has been in the greatly reduced amount of cooling tower maintenance. The calcium buildup has been miniscule and the little bit that has accumulated can be easily washed away with a garden hose and nozzle.

I have also noticed a huge reduction in the iron stains in the bathroom fixtures here at the factory as well as at home where I installed the second unit. At home, I eliminated my water softener that was running on potassium due to the ancient iron pipes that run all through the house and barn.

The water seems to feel and react just as well with the Vulcan as it did with the softener and I no longer need to buy the expensive potassium and break my back lugging around the heavy bags to reload the water softener. I don't mean to sound like a commercial for the unit, but those are the honest facts and observations.

Please feel free to stop by the next time you are in the area.

Kindest regards,

Chuck Nelson  
VacMet Inc. in California, USA  
[www.vacmet.com](http://www.vacmet.com)

## Energetika Ravne d.o.o Heat Exchanger

Slovenia

**ENERGETIKA RAVNE, d.o.o.**

Ravne RP  
12.00/1029/RJ

**SUBJECT: INSPECTION OF TUBE HEAT EXCHANGER (2X) UHP FURNACE,  
OPEN SYSTEM 40/30 °C**

Upon the agreement with Mr Petovar, we have concluded to inspect both tube heat exchangers on the secondary part of the UHP furnace.  
The front and rear covers of both exchangers shall be disassembled.

**PRESENT AT INSPECTION:**

Petovar – SŽ Metal Ravne, d.o.o. JUH OTO  
Oderlap, Vučko, Potočnik, Jamšek, Zapušek – Energetika Ravne, d.o.o.

**ESTABLISHMENTS:**

The inspected tubes were clean; there were no signs of lime scale accumulation.

The device for electronic softening is functioning well.

**CONCLUSION:**

We suggest that the device is purchased.



ENERGETIKA RAVNE d.o.o.  
RAVNE NA KOROŠKEM  
①



After Vulcan installation



Control of honey comb fill of  
cooling tower

# Holcim Cement Factory

Vietnam



## Holcim Kien Luong, Vietnam



### About Holcim cement factory

Holcim is one of the world's leading suppliers of cement and aggregates, and Holcim Kien Luong is the biggest cement factory in Vietnam.

The factory has problems with hard water in chiller, grinder and water supply pipe. They planned to spend nearly 400,000 USD to build and buy chemical systems to solve the problems. However, after installing Vulcan units, all the problems are solved with only 30,000 USD. This is the best investment!

### Before Vulcan installation:

- scale deposits in oil heat exchanger
- oil temperature >50°C: very high
- to clean every month
- heat exchanger has corrosion
- scale deposits clog the pipe

### Installed Vulcan models:



- 2 x Vulcan S250
- 1 x Vulcan S100
- 1 x Vulcan 5000

### Installation locations:

- the main water supply for the cooling tower
- the cooling tower for the big grinder
- the cooling tower for the small grinder

### Purpose:

- clean scale deposits
- prevent new scale
- reduce maintenance costs
- replace chemical dosing and softener systems

### After Vulcan installation:

- oil heat exchanger is clean
- temperature is stable at 37°C – 40°C
- no need to stop machines to clean anymore
- save 7% electric energy at grinders



Heat exchanger before Vulcan installation



Heat exchanger after 2 months Vulcan installation



Vulcan S250



Vulcan S250



Vulcan S100



Vulcan 5000



## THK Precision Industry

China



[www.thk.com](http://www.thk.com)

### THK Precision Industry Manufacturing Liaoning Co.,Ltd.

#### Installation details

Model: Vulcan S25  
 Location: THK Precision Industry  
 Installation area: The main water pipe of cooling tower  
 Installed by: Dalian Jiayifang

We used chemicals to remove the scale of cooling tower before. After Vulcan was installed, we stopped the dosing process, and all equipment is still running well. Vulcan completely replaced the chemicals and saves cost for the company.

In winter, the cooling tower runs with less water and full of ice, we observe every week and find that the scale is gradually reduced. After 4 months running with Vulcan, the scale in the water tank and cooling tower has been significantly reduced.



THK's Linear Motion (LM) Guide devices are an indispensable component of mechanical and electronic systems in a wide variety of industries, which are manufactured by THK for supply to customers worldwide.



Vulcan S25 installed on the main water pipe of the cooling tower.



[www.vulcan-jiayifang.com](http://www.vulcan-jiayifang.com)

# Toray Industries

Korea



## COMPANY INFORMATION

**Toray Industries, Inc**

Location: Gyeongbuk, Korea

Installer: DAWO INT Co., Ltd.

Model: Vulcan S25

Pipe size: 100 mm



Toray Industries produce, process and sell the following products: Fibers and textiles, plastics and chemicals, IT-related products, carbon fiber composite materials, environment and engineering products and pharmaceuticals and medical devices.

## SCALE PROBLEM AND APPLICATION

1. Scale problem on the plate heat exchanger
2. Regular (every 2-3 months) chemical cleaning of the pipes and heat exchangers



Vulcan S25 installed at Toray Industries



Before – without Vulcan

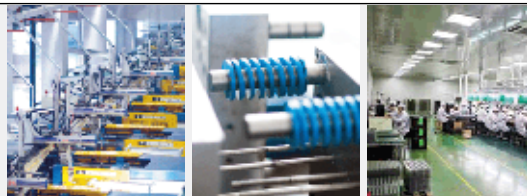


After 3 months – with Vulcan treatment.  
Up to now the installed pipe line needed no cleaning.



# Kunshan Xingbao Plastic

China



## Installation details

Location: Kunshan Xingbao Plastic  
www.xinbaoplastic.com

Model: S150 was installed for an injection molding workshop  
 S250 was installed for an air conditioning circulating water system

Installed by: Xinriyuan

## Xingbao Plastic

It covers 40,000 square meters and has about 400 employees. The major business lines include plastic injection, product assembling, painting, non-conductive vacuum metallization and mold manufacturing, and its wide ranges of products in the fields of electronics, home appliances, auto parts, medicine, and gardening are exported throughout the world.

## The scaling problems and the result

The injection molding machine had been scaled badly for years, so it was always difficult to clean the pipe, especially the heat exchanger of the mold temperature controller. The traditional cleaning way is to use a chemical, but it is costly and difficult, and it also harms the heat exchangers and pipelines.

After Vulcan S150 and S250 were installed, the clients are fully satisfied with their performance because they solved the scaling and iron filing problems on injection molding machines.

One and a half years after Vulcan was installed, we opened the mold temperature controller and checked the heat exchanger.



Untreated heat exchanger for 3 years.



After installing Vulcan for 1.5 years, the scale is gone without extra cleaning.

# Beauty Star Plastic Packaging

China



*Beauty Star*



## Beauty Star Co., Ltd.

Beauty Star Co., Ltd. is a state-owned enterprise that produces plastic packaging boxes, cosmetic packaging boxes and other injection molding products. It also cooperates for years with Wrigley Company, SK2, Blue Moon Industry and many other famous enterprises.

## Installation details

Model: Vulcan S150  
 Location: On the pipe of the dust-free workshop  
 Purpose: To solve the scaling problems of the injection molding machine  
 Installed by: Xinriyuan Company

## Before Vulcan was installed:

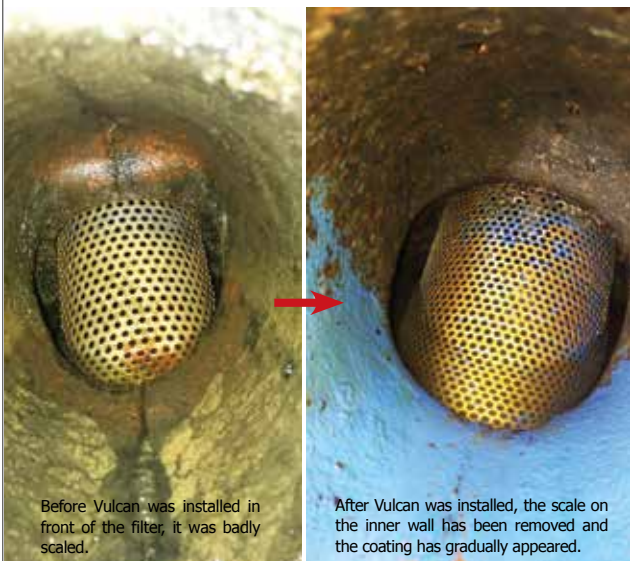
The heat exchanger and the pipe were badly scaled.

## 6 months after Vulcan was installed:

- When we opened the valve of the heat exchanger, we noticed that a lot of scale had disappeared
- The chiller and the cooling tower stay clean
- The "small holes" of the injection molding machine have become very clean, when they were blocked before, and the corrosion on the valve has gradually disappeared.

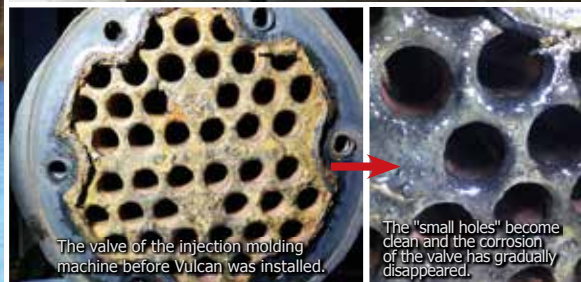


The S150 was installed on the pipe of the dust-free workshop to treat the water for the injection molding machine.



Before Vulcan was installed in front of the filter, it was badly scaled.

After Vulcan was installed, the scale on the inner wall has been removed and the coating has gradually appeared.



The valve of the injection molding machine before Vulcan was installed.

The "small holes" become clean and the corrosion of the valve has gradually disappeared.





# Cooling Tower in a Medicine Factory

Japan



## Vulcan test report on cooling tower in a medicine factory

### Installation details

**Model:** Vulcan S100

**Installation Area:** cooling tower in a medicine factory

**Circulation Water Capacity:** 100 m<sup>3</sup>/h

**Pipe Diameter:** 150 A



The cooling tower roof of medicine factory

### The purpose:

1. Prevents from scale
2. Prevents from heat exchanger effectiveness loss
3. Cleaning maintenance cost of plate heat exchanger can be reduced

### The effect:

After Vulcan was installed for some months, the scale in the cooling tower, plate heat exchanger and the pipe become soft; and it can be removed easily with a finger.



Vulcan S100 installation

### Cooling Tower Grid



Before Vulcan was installed: the outside of the cooling tower.



After Vulcan was installed for 5 months: the scale can be removed easily with a finger.



Before Vulcan was installed: the inside of the cooling tower.



After Vulcan was installed for 5 months: the scale has been reduced.



**Plate Heat Exchanger**



After Vulcan was installed for 9 months: ready open the plate heat exchanger and clean.



After Vulcan was installed for 9 months: the plate heat exchanger was taken apart for cleaning.



The scale on the plate heat exchanger becomes soft.



The scale can be easily removed.

**Circulation Pipe**



Circulation pipe



The scale in the circulation pipe can also be easily removed with a finger.

## Vulcan Effects on Cooling Towers

USA

### Data and Observations of the Effects of the Vulcan Electronic Descaler on Cooling Towers

**Installation site:**

The unit was installed on the 10 inch diameter line that feeds twin cooling towers (CT-1 and CT-2) at the FAMU/FSU College of Engineering.

**Model installed:**

Vulcan S250

**Objectives:**

The objectives are to prevent scale buildup on the cooling towers, remove the existing scale, eliminate the need for chemicals or time-consuming cleaning procedures, and to reduce energy costs.

**History:**

The maintenance for these cooling towers previously involved continuous injection of descaling chemical cleansers. The use of these cleansers was discontinued over a year prior to the installation of the Vulcan. In that time, the cooling tower flutes became encrusted with both scale and biofilm. Throughout the time period described below, there were no cleaning procedures in place with these cooling towers besides the treatment provided by the Vulcan.

**Observations over time after the Vulcan Installation:**

Between the time of the installation on July 16th and examination on August 1st, the green biofilm had begun to recede and gradually disappear. The next visit was about 3 weeks after the installation, on August 9th. At that point, the green biofilm had been further reduced and the scale deposits had begun to separate from the flutes in coin-sized flakes.

By August 20th, about a month after installation, the green biofilm had almost completely disappeared from the surfaces in contact with the Vulcan-treated water. The flakes of scale previously observed had fallen off in most places. The cooling tower flute surface area covered with scale deposits had been decreased by over 60%.

We are very optimistic about continued improvement with this application. In addition to these observations, water quality measurements were also obtained from each cooling tower and are summarized in the following charts.



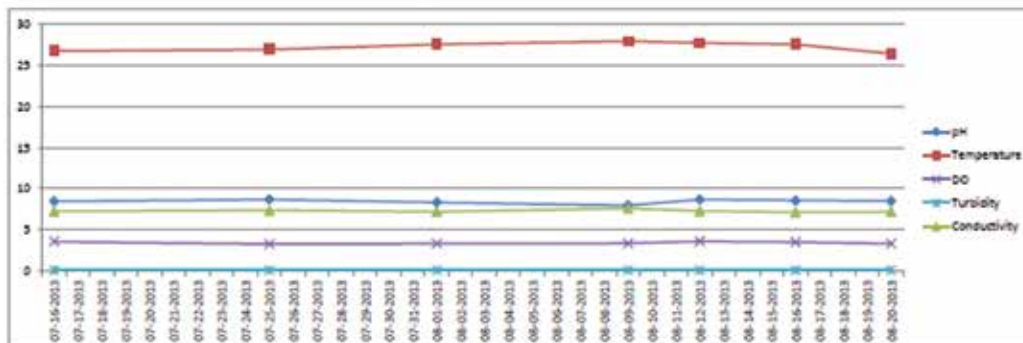
## Data and Observations of the Effects of the Vulcan Electronic Descaler on Cooling Towers

The Vulcan does not change the water quality beyond its affect on its propensity to cause scale buildup. As illustrated below, the pH, conductivity, dissolved oxygen level, and turbidity remained relatively constant during observation from before the installation to over a month after. Temperature is included, because of its affect on the other measurements and seems to correlate with the slight fluctuations observed.

### Cooling Tower 1 Basin

	Date	pH (SU)	Temperature (°C)	Conductivity (umhos/cm) *	Dissolved Oxygen (mg/L)	Turbidity (NTU)
Before Vulcan →	07-16-2013	8.46	26.7	7.22	3.56	0.1
After Vulcan →	07-25-2013	8.67	26.9	7.35	3.26	0.1
	08-01-2013	8.32	27.5	7.2	3.33	0.1
	08-09-2013	7.97	27.9	7.59	3.36	0.1
	08-12-2013	8.67	27.7	7.29	3.6	0.1
	08-16-2013	8.56	27.5	7.16	3.52	0.1
	08-20-2013	8.47	26.4	7.2	3.31	0.1

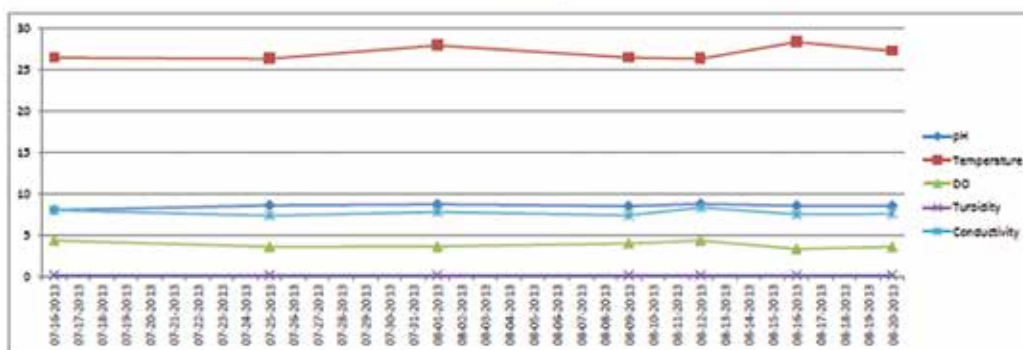
\* divided by 100 to fit within the chart scale



### Cooling Tower 2 Basin

	Date	pH (SU)	Temperature (°C)	Conductivity (umhos/cm) *	Dissolved Oxygen (mg/L)	Turbidity (NTU)
Before Vulcan →	07-16-2013	7.97	26.4	7.96	4.3	0.1
After Vulcan →	07-25-2013	8.56	26.3	7.29	3.52	0.1
	08-01-2013	8.67	27.9	7.76	3.56	0.1
	08-09-2013	8.44	26.4	7.35	3.96	0.1
	08-12-2013	8.73	26.3	8.28	4.3	0.1
	08-16-2013	8.5	28.3	7.46	3.26	0.1
	08-20-2013	8.52	27.2	7.53	3.52	0.1

\* divided by 100 to fit within the chart scale



## Data and Observations of the Effects of the Vulcan Electronic Descaler on Cooling Towers



Vulcan S250 installed on a 10 inch diameter line that feeds twin cooling towers (CT-1 and CT-2)



This photo was taken of the inside of CT-1.

It illustrates clean fillutes that are in constant contact with Vulcan-treated water and a few dry (untreated) areas that still have some remaining green biofilm.



The photographs above were taken of CT-1 about 3 weeks after the Vulcan was installed.



These photos were taken of CT-1 after about 6 weeks.

## Miscellaneous



## Clerfond Automobiles — Car Wash

France



### Installation details

**Model:** Vulcan S25

**Location:** Clerfond Automobiles  
Car Wash  
Av. Rhin et Danube  
72200 La Flèche  
France

**Installed by:** CWT Preval France



Car wash located at Clerfond Automobiles

### Clerfond Automobiles - Car Wash

The car wash located at Clerfond Automobiles suffered immensely from lime scale encrustations. After the Vulcan installation, scale deposits were no longer found on the pumps, filters, nozzles and brushes. Detergent use was reduced dramatically, and now the recently washed automobiles show no signs of scale spotting.



Vulcan S25



## Paris Country Club — Golf Course

France



# PARIS COUNTRY CLUB

**Vulcan installed at:**

Paris Country Club  
59 Rue Jean-Baptiste Pigalle  
75009 Paris  
France

**Installed by:**

CWT Preval France  
www.cwt-international.com

**Model:**

Vulcan S100

**The Paris Country Club**

The course is located just 10 minutes from Paris in the heart of the Saint-Cloud race course.

The Paris Country Club has a 9 hole golf course, driving range, 3 separate swimming pools, tennis courts, full gym, cinema, spa and massage area as well as a full restaurant.

**Application:**

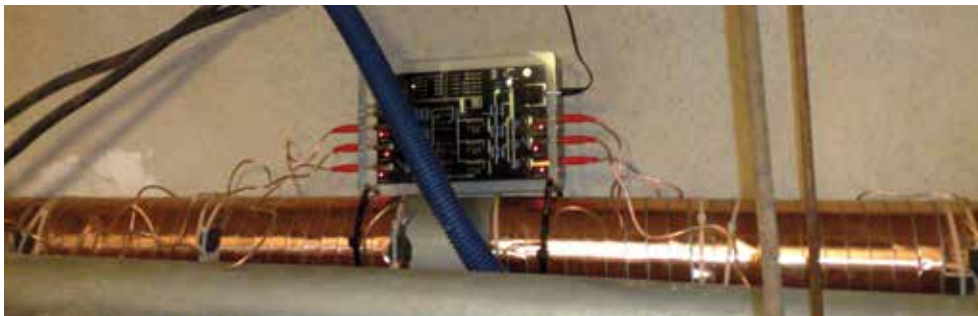
The Vulcan S100 unit was installed on the water main for the Clubhouse, to protect the bathrooms and kitchen areas from limescale deposits.



Vulcan S100 Anti-Scale System



Aerial view of the Paris Country Club



Installation of the Vulcan S100 unit in the Paris Country Club



## Średzki Water Park

Poland



### Średzki Water Park in Środa Śląska, Poland

The water treatment system Vulcan S25 protects the entire water supply network and all the heating devices of the pools of the Średzki Water Park.

The costs of normal treatment products with such a water flow of 25 m<sup>3</sup>/h would mean operating costs at 3.900 € per month (assuming 24 working per hour)!  
The cost of running the Vulcan S25 device is approx. 1,50 € per month.



## Recreational Swimming Centre

France



### Installation details

**Model:** Vulcan S25

**Location:** Centre Nautique du Val de Morteau  
Le Clair  
25500 Les Fins  
France

**Installed by:** CWT Preval France



Swimming pool and water slide inside the Centre Nautique

### Centre Nautique du Val de Morteau

Is a sports and recreational facility for the whole family. Their facilities include a 5 lane 25m swimming pool, a 200 m<sup>2</sup> spa pool with a bubble bench, solarium, indoor water slide and a mushroom waterfall.



Vulcan S25 installed on the main water line



Vulcan S25 impulse cables



Vulcan S25 impulse cables

## Ralons Lavandería Laundry Services

Spain



Dear Sirs,

After multiple problems with scale build-up in our irons and laundry equipment we decided to try and solve this situation. After much research, we finally found the solution we were looking for. We chose the innovative line of water treatment, Vulcan. The Vulcan S25 unit was installed.

Up until now, the results obtained have been entirely satisfactory; not only because the scale does not stick to surfaces anymore, but also because of the raised quality of the laundry which has a less-abrasive effect on the clothes. This has helped increase our service quality and customer satisfaction.

For the above reasons, we certify the complete effectiveness of the Vulcan S25 device installed in our company.

Sincerely,

**LAS PAMAS**  
C/ Puerto Rico, 2 Pta. 3 – 2º Ofic. 3  
35010 – Las Palmas de Gran Canaria  
Telf.: 902 226 047 • Fax: 928 226 008

**TENERIFE**  
Subida a El Mayorazgo, 16  
38009 – Santa Cruz de Tenerife  
Telf.: 922 236 030 • Fax: 922 211 048




**Esther Meca Cervera**  
Jefa Dpto. Sistema Integrado de Gestión  
Calidad, Medio Ambiente, PRL y Organización  
RALONS LAVANDERÍA, S.L.  
GRUPO RALONS

Reg. Merc. de Las Palmas de G.C.  
Folio 169 Tomo 1915  
Hoja GC-41486 Inscripción 1ª  
CIF: B-76014554

1 de 1  
[www.gruporalons.com](http://www.gruporalons.com)



## Pilbara Commercial Laundry Services

Australia

### Pilbara Commercial Laundry Services

Unit 5 9 Byass St,  
South Hedland,  
WA 6722  
Australia



Testimonial with Jamie Cavey

Hi, my name is Jamie Cavey and I operate the only commercial laundry in Pilbara - The Pilbara Commercial Laundry Services. We are a mid-size operation that specializes in the laundering of hotel linen, mine site linen and work clothes.

Living in a hard water area like Pilbara means we have ongoing problems with calcium build up in our piping and air-conditioning systems. The calcium sticks to the heating elements and the whole internal section of the hot water system becomes completely clogged with calcium.

Twelve months ago we installed a German made CWT Water Treatment System from the team at Southern's Water Technology in Bunbury and immediately we noticed a significant reduction in the build up of calcium.

I believe we have quadrupled the life span of our evaporated air conditioner and we haven't had to replace our hot water system for more three years.

Without the CWT Water Treatment System we would be replacing our hot water system every two years at a cost of more than \$10,000.

**There is no doubt the CWT Water Treatment System will prolong the life span of your piping and hot water systems and evaporative air-conditioning units.**

After the treatment, the adhesiveness of the crystals is reduced so that scale is unable to form in the pipes.

**You can actually see the calcium slowly breaking down through the drainage system.**

Sincerely,

Jamie Cavey

## St. Olav's Church Los Angeles

USA



### Vulcan 3000 electronic anti-scale system

This is a statement from The Norwegian Seamen's Church in Los Angeles / San Pedro after we have used the Vulcan 3000 anti-scale system for a few months. We replaced a water softener system which used salt and special filtering system, as it was very expensive to maintain and it covered only part of the water system.

We decided to replace the water softener with the Vulcan Descaler 3000 unit. The result now is amazing, the clogging of the shower nozzles is gone, and the kitchen faucet nozzles are spraying evenly and our commercial grade dishwasher is cleaner and works better. We use a lot less detergent when doing laundry as the Vulcan 3000 makes the detergent work so much better.

Best regards

Knut Selle  
Facility Manager  
St Olav's Church Inc  
Norwegian Church in Los Angeles / San Pedro

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St. Olav's Church inc. P.O.Box 1621  
1035 South Beacon Street  
San Pedro, CA 90733-1621. USA



## Mc Clean Public Restrooms

Switzerland



[McClean AG | Spitalstr. 18 | 4056 Basel](#)

Vulcan-System  
 Mr. W.Kurt  
 Probsteiholzweg 11  
 4103 Bottmingen

Dear Mr. Kurt,

after a few months testing the Vulcan anti-scale system in our hygiene center in the station SBB of Basel, we are very happy with the results. The visible scale deposits are less and the cleaning is much easier than without Vulcan – with less need of chemicals. Also the scale deposits of the cisterns and shower heads are much less, so we have less maintenance costs. We recommend your Vulcan system and we will install more Vulcan systems in further of our sanitary stations in Switzerland.

With best regards

McClean AG

  
 Raphael Zimmermann  
 Managing director

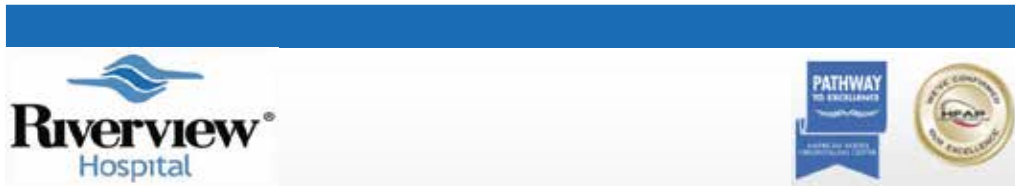


Vulcan anti-scale system in the hygiene center of the station in Basel.



# Riverview Hospital

USA



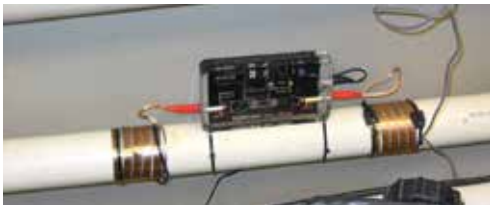
### Installation details

Model: Vulcan 5000  
 Vulcan S10

Location: Riverview Hospital  
 Noblesville, Indiana

Installation area: Swimming Pool

Installed by: Salt-Free Water Systems



Vulcan 5000 on main pool skimmer line



Vulcan S10 on main pool line



Swimming pool chlorinator in service 30 days before installing Vulcan units



Swimming pool chlorinator in service 30 days after installing Vulcan units

# Gegenbauer Health Care Services

Germany

## Gegenbauer

Facility Management seit 1925.

Gegenbauer Health Care Services GmbH . c/o St. Joseph Krankenhaus.  
Bäumerplan 24, 12101 Berlin

Firma  
Christiani Wassertechnik GmbH  
Charlottenstraße 18

10117 Berlin

**Gegenbauer  
Health Care Services  
GmbH**

c/o St. Joseph Krankenhaus  
Bäumberplan 24  
12101 Berlin

**Ihr Ansprechpartner**

John Behrens  
Gegenbauer Health Care Services GmbH  
im St. Joseph Krankenhaus  
Bäumberplan 24  
12101 Berlin

### Vulcan S 250

Dear Mr. Christiani

we are a facility management company responsible for the maintenance and repairs inside the St Joseph Hospital in Berlin. Due to the hard water in Berlin, we used to have very bad problems with scale incrustations on the sanitary equipment. The maintenance and cleaning of the 2,500 showers and bathrooms alone was at a very high cost.

We have had the Vulcan S 250 installed inside the hospital now for a couple of months. We can identify a considerable benefit of the unit installed. We can barely see any scale deposits on the shower heads any more. This saves manpower and costs associated with exchanging sanitary equipment.

We can honestly recommend the unit installed by CWT GmbH.

Regards,

John Behrens  
Service Manager

Geschäftsführer:  
Hilger Reitzel  
Hilmar Gebhardt  
Wolfgang Wegener

# Jinzhou No. 2 People's Hospital

China

## Jinzhou No.2 People's Hospital

### Installation details

Model: Vulcan S10

Installation Location:  
Jinzhou No.2 People's Hospital in Dalian city

Installation Area:  
Main water pipe for daily life water

Installed by:  
Dalian Jiayifang Water Technology Co., Ltd.

The water of the hospital is coming from the ground, so the water hardness is very high. The entire piping system and equipment have a lot of scale.

After Vulcan was installed for two months, by observing the faucet, we found the scale was reduced in the pipe and equipment and the water feels softer.

### About Jinzhou No.2 People's Hospital

The hospital is located in Jinzhou New District. It provides the public health and basic medical services for more than 40,000 people. It is also responsible for emergency tasks of 200,000 people in eastern Jinzhou.



Vulcan S10 installed on the main water outlet pipe.



The front door of Jinzhou No.2 People's Hospital in Dalian city.

## Philipp Best Plumbing

Australia

### Phillip Best Plumbing

All Your Commercial & Industrial Plumbing Needs

Plumbers & Gasfitters - Bunbury, WA

PO Box 1733, Bunbury WA 6231

Southern Water Technology  
6 Teede St  
PO Box 553  
Bunbury WA 6231  
Australia

#### CWT - Physical water treatment system

I've been in the plumbing industry for 32 years and currently have five staff working for me at Phillip Best Plumbing in Western Australia. Since becoming available in Australia, we've purchased a number of CWT water systems to stop calcium deposits building up in a range of different piping systems. These deposits create many unwanted effects such as clogged pipes and irreversible damage to pipes and other plumbing parts.

I found the CWT water treatments to be very effective in high temperature heating systems such as commercial combustion ovens in restaurants and even in a very high temperature heating system at a local abattoir. There are also huge time savings associated with CWT water systems. Installation time is cut by at least 90% when compared to similar units. The units, which are made in Germany, are also at least 50% cheaper than other units currently on the market.

The units, which allow scale particles to be washed away, are not only proving to be successful in commercial and industrial applications, but in private homes with scale and rust problems. I installed a CWT system to protect the hydraulic heating system, which lies under the cement slab of our home.

CWT has been a great cost saving unit initiative that will protect your piping system from ongoing scale and rust problems.

Your Phillip Best Plumbing Team





## HANS KREMPL Residential Technologies

Germany



HANS KREMPL . HAUSTECHNIK GMBH

Christiani Wasser Technik GmbH  
Herr Christiani  
Berlin, Germany

Koblenz, Germany

Dear Sir,

We have been selling your Vulcan 5000 water treatment system for over 10 years. In this time we have successfully sold more than 1000 sets of equipment. We have consistently received positive feedback from our customers in view of the effectiveness of the system - patches of limescale which could previously only be removed by chemical detergents can now simply be wiped away with a cloth. What is more, the use of the system has notably reduced the calcification in the heating of electrical equipment (e.g. washing machines, dishwashers, kettles etc).

We wish you and your company further success and in the above mentioned matter would like to thank you for a successful collaboration.

Yours Sincerely,

- Hans Krempel jun. -

## Water Supply for the Area of Anoia

Spain



AIGVA·DE·RIGAT·S·A

AIGVA DE RIGAT S.A  
C/ Comarca, 47  
08700 Igualada

[www.aiguaderigat.cat](http://www.aiguaderigat.cat)

To the Vulcan Spain Team,

Rigat is a company related to the operation of the water cycle in the region of Anoia since 1921. For more than 80 years, we have shared the same commitment and responsibility to ensure at all times the water supply is of the highest quality with minimal environmental impact.

We installed several Vulcan units just before the water meters, which were always filled with calcium and often become clogged. Because of these problems, we would have to change them frequently.

In the batteries where we installed the Vulcan S100 and S500, we always experienced the same results - there wasn't any more limescale and calcium deposits.

We take this opportunity to thank you for the great service.

Mr. Caltron Aqua


AIGVA·DE·RIGAT·S·A

## Exhibition Center Cologne

Germany



c/o Bayer Gastronomie GmbH · Deutz-Mülheimer Straße 30 · 50679 Köln  
Deutschland

Catering managed by  
 Bayer Gastronomie

**Christiani Wassertechnik GmbH**  
**Heinrich-Heinstr. 15**  
**52249 Eschweiler**

### Vulcan 3000 Service Report

Dear Sir,

A few months ago we installed your Vulcan 3000 water treatment system in our catering services at the Cologne trade fair. In recent years we have had problems in particular with the coffee machines and dishwashers due to the hard water in Cologne.

The machines had to be maintained frequently and the cleaning costs of the kitchens were very high.

After the installation of your water treatment system in our bistros I noticed a clear improvement of the situation. The limescale deposits are now much easier to remove thus easing the workload of the staff. Less detergents are needed and I am altogether extremely satisfied with your device.

Unfortunately I am unable to give a long-term conclusion over the scale reduction at this point in time as it is not possible to see inside the pipes. I am convinced however by the effects visible outside the pipes and can therefore fully recommend Vulcan.

Yours Sincerely,

Gabor Ernoehazai  
Technical Manager Cologne trade fair

Koelnmesse Service GmbH  
Messeplatz 1  
50679 Köln  
Deutschland

## Garden Shop — Agriculture

Greece



Dimitrios Vasileiadis  
Garden shop  
Papas-Vasileiadis-Loizidou OE.  
Aerodromiou Sedes str & Aerodromiou Makedonia str.  
570 01Thermi-Thessaloniki  
Greece

Christiani Wassertechnik GmbH  
Köpenicker Str. 154  
10997 Berlin  
Germany

Dear CWT,

I am a professional cultivator of decorative plants and trees for more than 30 years. I have always had hard water quality problems. This water, I irrigate with it, comes from a bore. This water is brackish, which means of course, it is very bad for the plants. Actually, I have been burning my plants all these years because of large amounts of calcium and magnesium.

I also have to emphasize on the fact that all these years the leaves of the plants had a white colour and not the well known green colour. That is of course because of too much salt of the water.

Installing the Vulcan S 25 device, I found out that there are not any more white sedimentation on the leaves and soil. Most of all I realize that there is a big improvement in the growth of my plants. I also found out that there is a better and quicker foam creation. Wherever we want to wash our hands or even clothes etc.

Finally, I must say that I really found the solution to my problem, which has been bothering me for all these years, using the Vulcan device.

I really have to thank you from the bottom of my heart.

  
Δημήτριος Βασιλειάδης



Without treatment



With Vulcan treatment

## Cattle Farm

Germany

Christiani Wassertechnik GmbH (CWT)  
Köpenicker Str. 154  
10997 Berlin  
Germany

Dear Mr. Christiani,

Thank you a lot for sending me the stronger electronic system, which I installed immediately. I noticed that the drinking behavior of the animals improved promptly. I can give you more details after a longer observation period. Now about the promised observation of the CWT water treatment device:

After 2-3 days of the installation, it was remarkable that the lactating sows were permanently drinking from the drinking trough and that therefore the milk production also improved after 14 days, which again led to higher weights of the piglets (before: ca. 7 kg, now: 8 kg). This continued for several months.

Furthermore, we observed that scale and biofilms in old pipes for liquid feeding dissolved, leading to an improved feeding behavior of the fattened pigs. Moreover, we used to have trouble with flank abscesses due to biofilms that were probably caused by bacteria discarding endotoxin. This progressively improved with the use of CWT water treatment.

I can also tell you about a cow farmer whose pipes were not clogged anymore after the installation of CWT products. Before, he had to flush the pipes every 4 weeks with air and water to make sure the cows could get enough water through the pipes. He could furthermore observe that the biofilm on the high-alloyed steel drinking trough dissolved after 14 days. After about 4 weeks, the farmer also reported that the cows produced about 0.5 L more milk per day.

Negative observations:

The next year in February, I started to occasionally add acids in the tubes with the consequence that the positive effect of the CWT water treatment mostly vanished. Furthermore, new biofilms built up in the pipes, which I could make visible by flushing the pipes. The animals began to show more flank abscesses and ear necrosis again. This improved again after the flushing in the beginning of June. Then, on 19 July, I installed the stronger electronic system. Since then, I have the feeling that the livestock has stabilized and has become more vital.

I hope I can give you more positive news soon and that I can tell you, whether an occasional addition of acid to the water system is possible without damages, since it is common practice to use acidity products in farms holding pigs and turkeys.

Please don't hesitate to contact me for further questions.

Best regards,

Hubertus Fasselt





## IFCO Reusable Plastic Containers

USA



Reusable plastic containers  
for transporting fresh produce



### Vulcan installed at:

IFCO - Chicago  
Pallet Recycling  
60608 Chicago  
Illinois, USA

Dick Van Voorhis - Salt-Free Water Systems

5 x Vulcan S100 units are installed on a large produce cleaning system at IFCO in Chicago. IFCO is an international pallet recycling company with plants in 26 countries. The washer is manufactured in Italy by Colussi Ermes s.r.l. The entire washer, including the pipe is stainless steel.

As discussed earlier, the produce cleaning system in factory had very short pipe lengths. Therefore, we had to wrap each impulse cable wire around the pipe 2 times. After 2 weeks we have had confirmation from the engineer confirming the Vulcan was doing everything you said it would do!

After confirming the effectiveness of the Vulcan, we have installed S100 units on all 5 washing stations within the Chicago IFCO plant.



Vulcan S100 units installed on the produce cleaning system



Vulcan Impulse Cables double wrapped on water pipe



Vulcan S100 unit installed on the produce cleaning system



Containers coming out of the produce cleaning system

# Reducing RO Membrane Replacement Frequency with Vulcan

China



## the Improvement Project for Reducing RO Membrane Replacement Frequency

### Installation details

#### Installation location:

A factory in Inner Mongolia Huomei Wheel Manufacture Co. Ltd., which produces aluminium alloy wheel. Vulcan was installed in the painting workshop, for the pure water section. Pure water is produced by RO membrane (reverse osmosis membrane).

**Installed by:** Suzhou KaiEnSheng

**Installation model:** Vulcan S10

**Pipe size , capacity:** 65 mm, 15 m<sup>3</sup>/h

### About Huomei Wheel Manufacture Company

Located in Huolinguole Industrial Park, Inner Mongolia. It is one of the largest aluminum wheels manufacturer in northern China.



Pure water process equipment.

### Scaling problems

Before installing Vulcan, adding scale inhibitor was the only descaling method, and the RO membrane would be replaced every 2-3 months, sometimes even more often: every 1-2 months! Each replacement costs about 9,000 USD.

### Results

Since the Vulcan was installed in April 2017, the RO membrane has not been replaced until now (October 2017), and the use of scale inhibitors has also been reduced by 50%. So far, the estimated cost savings are around 25,000 USD.

### A letter from production department of Huomei Wheel Manufacture Company

From May 2016 to January 2017, 5 sets of RO membrane were replaced, they cost 50,000 USD.

The issue is urgent.

We found that the problem comes from the water quality. Suzhou KaiEnSheng recomands Vulcan for us to try. Surprisingly, the effect is very good.

Vulcan was installed on April 6, the conductivity after the three-stage RO membranes were: 17.1, 22.7, 21.5 ( $\mu$ -Siemens/cm) on the day. Over 4 days, we already saw noticeable effect. We measured the conductivity again on May 4 after the three-stage RO membranes were down to 11.5, 11.5, and 11.6 ( $\mu$ -Siemens/cm). We will keep tracking the effectiveness.



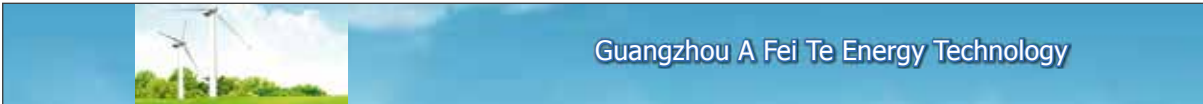
PRODUCTION DEPARTMENT



S10 was installed before the reverse osmosis membrane.

# Suining New Oasis Printing & Dyeing Factory

China



Guangzhou A Fei Te Energy Technology

**Model:**  
2 X Vulcan S10, 1 x Vulcan S25, 1 x Vulcan S100

**Installation location:**  
Sichuan Province, Suining New Oasis Printing & Dyeing factory

**Vulcan Effect:**  
In the beginning, there were 3 Vulcans installed. One Vulcan S25 for water filtration of alkali recovery system, one Vulcan S10 for pre-dyeing system and another S10 for post-dyeing system. We particularly installed a short tube for monitoring result, and saw excellent performance after 3 months, so that additional S100 for the sludge dewatering system was installed.



The Vulcans not only save a lot of water treatment costs, bring a significant reduction of filter cloth (cost), but also reduce the workload for workers to fight against scale.



Vulcan S25 outdoor installation



Vulcan S100 in the sewage room for the sludge dewatering machine.



Before Vulcan was installed, the pipe was scaled and rusty.



After Vulcan was installed for 3 months, the outer rust had been fallen off completely.



After Vulcan was installed only for 1 month, the scale is softened and falling off.



## Mondi Packaging Factory

Czech Republic



Mondi Štětí a.s.  
Litoměřická 272  
CZ - 411 08, Štětí  
www.mondigroup.com

### Vulcan S100 Installation

To the Kostečka Team,

The Vulcan device is installed on lime oven, which usually required extensive scale cleaning every 3 months. It has now been 4 months since installation of the Vulcan S100, and the scale problem have reduced significantly.

Now the pipes and production equipment require much less cleaning. We are very satisfied with the performance of the Vulcan S100 Unit.

Best Regards,  
The Mondi Group



Mondi Štětí a.s manufacturing plant in the Czech Republic



Deposit removed from pipe after Vulcan installation



Vulcan S100



Installation of Vulcan S100 on lime kiln



## Avignon Ceramic Core Production

France



### Installation details

**Model:** Vulcan S25  
Vulcan S100

**Location:** Route de Noirlac  
18200 Bruère-Allichamps  
France

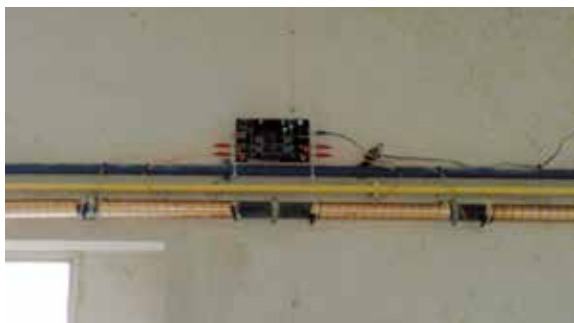
**Installed by:** CWT Preval France

### Avignon Ceramic Factory

Avignon Ceramic is an independent ceramic cores manufacturer for investment casting. With nearly 20 years of experience in design and production of ceramic cores, Avignon Ceramic offers a wide range of products, of various sizes and complexity levels from millimetres to nearly 1 meter, and from very simple to the most complex shapes.



Vulcan S100 installed in Avignon Ceramic



Vulcan S25 installed in Avignon Ceramic



Avignon Ceramic production line



## Alcoa Aluminium Factory

France



### Vulcan installed at:

ALCOA Aliminum Factory  
in France

### Installed by:

CWT Preval France

### Models Installed:

1 x Vulcan S10

2 x Vulcan S25

1 x Vulcan S100

### ALCOA Aluminum Factory

Alcoa is the world's leading producer of primary and fabricated aluminum, as well as the world's largest miner of bauxite and refiner of alumina.

Their facilities in France produce technologically advanced products that include aluminum sheets and plates, aluminum architectural products and systems, fasteners and fastener installation systems, structural castings, turbine engine components and aircraft frame components. Alcoa employs approximately 61.000 people in 30 countries worldwide.



Vulcan S25 installed in the Alcoa Aliminum factory in France



Vulcan S10 installed in the Alcoa Aliminum factory in France



Vulcan S25 installed in the Alcoa Aliminum factory in France



Vulcan S100 installed in the Alcoa Aliminum factory in France

## Dalian Power Plant

China



HUANENG POWER INTERNATIONAL  
DALIAN POWER PLANT



Huaneng Power International Inc., was established in 1994 administrated by the State Council of the People's Republic of China. It is one of the five largest power producers in China. It engages in the development, construction and operation of large power plants.

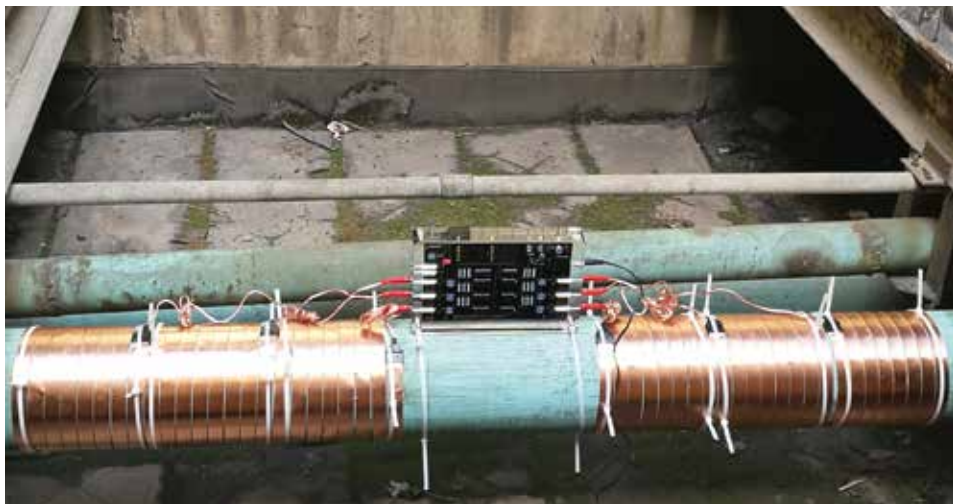
**Model:** Vulcan S100

**Installation Location:**  
Huaneng Dalian power plant

**Installation Area:**  
Inlet water main of cooling tower

**Installed by CWT distributor:**  
Dalian Jiayifang Water Technology Co., Ltd.

**Installation Reason:** to solve the serious scaling problems in cooling tower



Vulcan S100 was installed on the inlet water main of cooling tower in Huaneng Dalian power plant. The pipe diameter is 150 mm and the material is steel.

# AMC Measuring and Control Devices

Algeria




المؤسسة الوطنية لأجهزة القياس و المراقبة  
 ENTREPRISE NATIONALE DES APPAREILS DE MESURE ET DE CONTROLE  
 (S.P.A. AU CAPITAL SOCIAL DE 1.462.825.000 DA)  
 SOCIÉTÉ DU GROUPE SONELGAZ



B.P. 02 - Route de Batna - EL-EULMA - Wilaya de Sétif

**Location :** Algeria  
**Application:** Production of water meters and electricity meters  
**Department :** Infrastructure



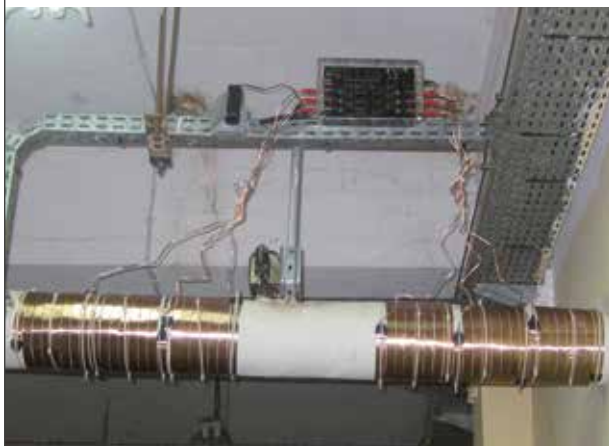
Vulcan was installed by:  
 Eurl FCGBI (ISSIAKHEM)

## CERTIFICATE OF GOOD PERFORMANCE

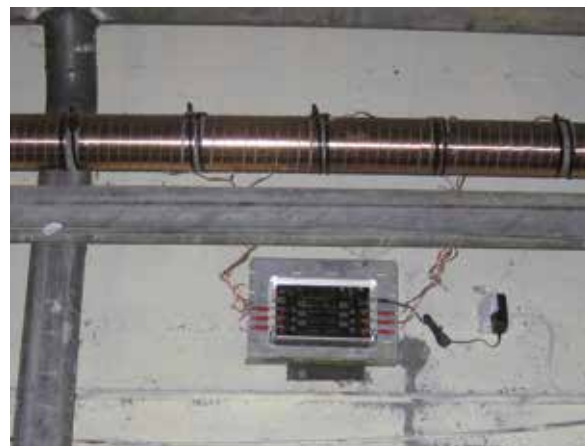
We hereby ensure great satisfaction after installing the physical water treatment system Vulcan S100 and Vulcan S250 with its Impulse-Technology.

The factory where Vulcan is installed produces electricity meters and water meters.

**EURL FCGBI**  
 The Head of Department  
 Infrastructure



Physical water treatment with Vulcan S100 and Vulcan S250.



The installation of Vulcan S100 in a water meter and electricity meter production.

# Independent Studies and Scientific Papers

**Studies and Papers**

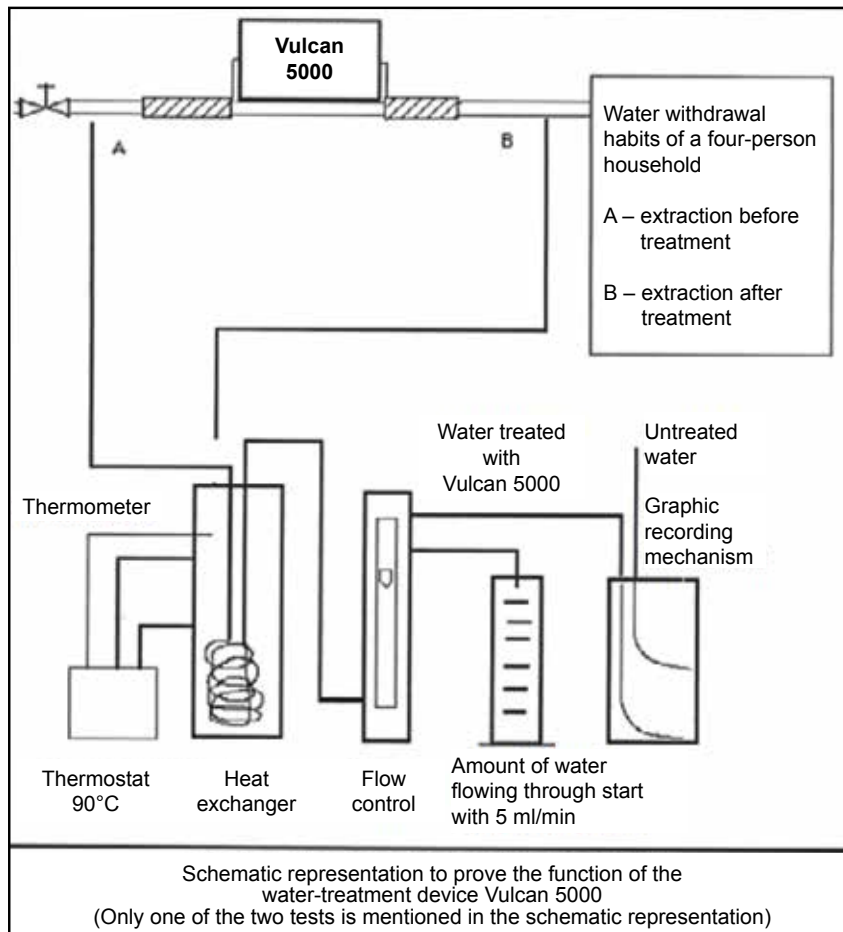
From Institutes and Laboratories



# Steinbeis Institute Foundation

Germany

## Centre for Environmental Chemistry







**STEINBEIS-STIFTUNG FÜR  
WIRTSCHAFTSFÖRDERUNG**  
(Foundation of economic promotion Reutlingen)

**TRANSFERZENTRUM REUTLINGEN  
ANGEWANDTE UND UMWELTTECHNIK**  
(Transfer Centre - Applied and environmental chemistry)

## **Expertise**

### Concerning the effect of the water-treatment device "Vulcan 5000"

Test subject: water treatment device "Vulcan 5000"

Manufacturer: Christiani Wassertechnik GmbH (CWT)  
Heinrich-Heine-Str. 15  
D-52249 Eschweiler

Test instruction:

A test should be carried out to determine whether Vulcan 5000 can reduce lime deposits in water pipes and household equipment in a purely physical manner without altering the water chemically.

Experimental demonstration of function:

The effect was verified in a heat exchanger arrangement using two identical testing units. Water was withdrawn from the water pipes simultaneously upstream and downstream of the device to be tested and calcium precipitation forced in the heat exchangers.

As lime deposits increase, the flow of water decreases. The more water flows through the experimental arrangement, the smaller tendency there is for the water to form scale on pipes and container walls. The test was carried out on the basis of the practice-related water withdrawal of a four-person household with the additional regular withdrawal of five litres of water at half hourly intervals for a total of six weeks.

This test showed that the tendency to form lime deposits is reduced considerably by the "Vulcan 5000" water-treatment device. In addition, the effect continues for some days after "Vulcan 5000" has been switched off. Seemingly, the effect is not only limited to a certain part of the pipe, but also passed into the water flowing nearby sections of the pipe.

Reutlingen,

(Prof. Dr.D. Frahne)

## Physiological Institute of the University of Munich

Germany

# PHYSIOLOGICAL INSTITUTE

Medical Facility  
Ludwig-Maximilians-University Munich

Directors: Prof. Dr. G. ten Bruggencate, Prof. Dr. E. Gerlach, Prof. Dr. h.o.K. Thureau

Dipl.-Phys. Franz Rucker

Physiological Institute Pettenkoferstr. 12 80336 München

Pettenkoferstr. 12  
80336 München

Christiani Wassertechnik GmbH  
z.Hd. Herrn Kleefisch  
Heinrich-Heine-Str. 15  
52249 Eschweiler

### **Test of the electronic water-treatment system Vulcan 5000 for the cooling system of the laser Innova 90-K of the company Coherent GmbH (user report)**

Dear Mr. Christiani

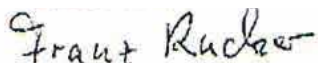
Referring to our telephone call on the 18th of December, I would like to send you a description of our trial of your electronic water-treatment device Vulcan 5000.

The system Vulcan 5000 was installed at the end of March in the coolant inflow of a crypton gas laser Innova 90-K manufactured by the company Coherent GmbH, supplied with water from the system of mains, to reduce or even avoid lime deposits on the ceramic covering of the laser tube. Over the past years we constantly had difficulties with laser tubes which were not in working order any more and consequently had to be replaced due to thick lime deposits on the ceramic of the tubes through which the coolant flows with approx. 9L/min and a pressure of approx. 2.5 bar and at the same time heats up to a temperature between 60°C and 70°C depending on the gas discharge electricity (tube electricity) between 30 A and 40 A.

The system Vulcan 5000 is an economic alternative to expensive heat exchangers, i.e. closed circulations of coolant with treated water. These heat exchangers cost about 5,000€. The device Vulcan 5000 has been used on a trial basis since the end of March to treat the coolant of our gas laser. On the 12th of December the company Coherent GmbH checked the laser tubes for lime deposits on the ceramic surface. No lime deposits were detected, therefore, it is in all a positive result.

During the test period the laser was in operation approx. 200 hours with a laser tube electricity ranging from medium to maximum and with operation times between four and eight hours. These operation periods and the accomplishment required correspond to the normal use of the laser in our fluorescence microscopic experiments. Laser tubes previously used in a similar way, which worked without a treatment of the coolant, showed considerable lime deposits.

Fanz Rucker



# 4-Year Field Tested of Vulcan for the Cooling Tower at Supermal Karawaci

Indonesia



## 4-Year Field Tested of Vulcan for the Cooling Tower at Supermal Karawaci (SMK)



### Installation details

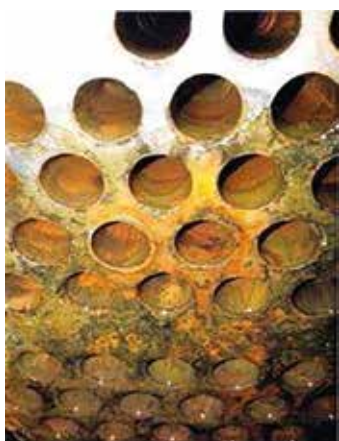
<b>Model</b>	Vulcan S500
<b>Tested field</b>	Supermal Karawaci, Tangerang, Indonesia
<b>Operating times</b>	This large Supermall operates 7 days a week from 9:30 to 21:30, 365 days of the year
<b>Tested location</b>	One of 7 cooling towers servicing the Mall's water cooled package air-conditioning systems. The cooling tower selected is a 408TR system containing 45 m <sup>3</sup> water volume with a water flow rate of 318 m <sup>3</sup> /h in an open circuit system.
<b>Testing period</b>	February 2014 - February 2018 (4 Years)
<b>Installed by</b>	PT Biosolutions Indonesia



Vulcan S500 was located inside aluminum box and installed on a cooling tower main pipe in Supermal Karawaci.

### Inspections

The photographs show that the refrigeration condenser tubes, from the beginning to the end of the trial period, were "as clean as new".



**First Inspection: March 4, 2014.**

The heat exchanger tube plates were removed to reveal the inside surface of the copper tubes. Since these tubes had recently been manually cleaned, virtually no scale was present, as is obvious on this photo.



**Last inspection: February 12, 2018 at the end of the 4-year trial**

The inside surfaces of the copper tubes show zero additional scale formation after 4 years in the test period.

Please note that for 4 years of 365 days continuous operation, there has been:

- No chemical water treatment.
- No bleed off of waste water.
- No cleaning of condenser tubes.
- No water treatment specialists employed.
- Copper tubes in the condensers stay very clean – without scale.
- No cleaning of the cooling tower inside surfaces.



**Inspections during the 4 years:**

- 2014 - 4 times
- 2015 - 2 times
- 2016 - 2 times
- 2017 - 1 time
- 2018 - 1 time

**At each inspection, the following procedures were followed:**

1. One of the refrigeration "Shell and Tube" condensers was opened and the tubes inspected.
2. Condenser tubes were photographed.
3. Cooling tower water sample was sent to lab.
4. Refrigeration hot gas pressure gauges were checked.

**Showing copper tubes of AC condenser heat exchanger on dates indicated:**



**First Inspection: March 4, 2014**



**June 1, 2014**



**December 10, 2014**



**June 3, 2015**



**October 27, 2016**



**Inside of heat exchanger. Condenser end plate had lost all scale that was there previously. (Light spot at bottom is reflected light.)**



**August 3, 2017**



**Last inspection: February 12, 2018**





### Significant findings as a result of the 4-year field tested trial:

- Scale build-up did not take place. During this 4-year trial period, no scale formation was found on the condenser heat exchanger copper tubes of the system.
- We have found conclusively that EC (Electric Conductivity) levels of up to 10,000  $\mu\text{S}/\text{cm}$  can be safely ignored. Similarly, high TDS, metals, anions and many other substances in cooling tower water can be ignored when Vulcan is used. cooling tower water blow downs are vastly reduced because with the Vulcan the maximum EC limit increases from 1,200  $\mu\text{S}/\text{cm}$  in chemically treated cooling tower water systems to the much higher limit of EC 10,000  $\mu\text{S}/\text{cm}$  for the electronic method of cooling tower water treatment.

At the new 10,000  $\mu\text{S}/\text{cm}$  EC limit, the need for cooling tower water blow down will likely be reduced from almost daily to once or twice per year.

- No system maintenance was required.
- All AC compressors ran entirely at clean condenser efficiencies.
- R22 refrigerant gauges on all condensers remained at constant hot gas head pressure.



### Summary of Benefits:

- Large savings on **chemicals**. The complete elimination of chemicals in this cooling tower operation during the field test supports the fact that Vulcan is "eco friendly" and would meet the Leeds and Green Mark Building Criteria required for "Green Building" designation anywhere in the world. Enjoy the benefits of a world class, **sustainable and "Green" Cooling Tower!**
- Huge savings on **blow down** water consumption. Significant energy and water savings due to clean condenser tubes and no need for water blow downs below electric conductivity 10,000  $\mu\text{S}/\text{cm}$  levels with the electronic cooling tower water treatment system – representing alone a saving of virtually all previously wasted water due to blow downs.
- Savings on **payroll** – no operational stoppages required for condenser cleaning, less testing and fewer inspections needed.
- Savings on **supervision** – engineers appreciate the "set and forget" of this automatic water treatment system. Frequency of inspections and laboratory expenses for cooling tower water testing are reduced due to the safety and reliability of the electronic systems.
- Scale formation was eliminated. Refrigeration compressors operated at peak efficiency due to no scale in the condensers.
- Rust prevention in iron pipes is an added benefit of the Vulcan system.



# Physical Water Treatment as the Solution for Cooling Towers

Japan

## Test report on Vulcans (pulsed water treatment systems) installed as a preventive measure against scale buildups causing faulty of the cooling towers

**Tested field:** Factory of a pharmaceutical company  
**Installation sites:** Cooling towers on the rooftop of the second building  
 2-1 cooling tower **A:** Makeup water piping size is 50A.  
 2-2 cooling tower **B:** Makeup water piping size is 50A.  
 1 cooling tower **C:** Makeup water piping size is 50A and circulating piping size is 80A.

**Model installed:**  
 Vulcan S25  
 (water treatment capacity: 25 m3/hour)

**Date installed:**  
 For the cooling towers A, B, and C: July 22  
 For the cooling tower C: October 6

Vulcan installed on the makeup water piping (50A)



Used for cooling towers A, B and C

Vulcan installed on the circulating piping (80A)



Used for the cooling towers C

**Objectives:**

- 1 To prevent scale buildups on the cooling towers.
- 2 To reduce chemicals used for water treatment (measure for complying with ISO 14001)
- 3 To save the energy cost by preventing the deterioration of the heat exchange effectiveness

### Verification of the effectiveness:

After installation of the Vulcans, the statuses of the cooling towers A, B, and C were inspected without using any water treatment chemicals. Even after elapse of approximately six months, almost no scale build-ups were observed inside the refrigerators and the heat exchanger tubes, and no water pollution warning was displayed. (Usually, without water treatment chemicals, the water quality is deteriorated and water pollution warning is displayed.) Silica adhered on the cooling towers was easily removed with a finger. With these results, the effectiveness of the installation of the Vulcans could be confirmed.

### Remarks (Summary)

The water treatment system, Vulcan, has the following features: (For details, refer to the brochure attached.) Vulcan changes only the crystal structure of scales without changing the quality of water. Therefore, nothing is added or reduced to or from the ingredients of water. The water through Vulcan is soft and has an increased permeability. Vulcan can be used as better cooling water.

(\*) The effectiveness of the water treatment in the water supply line will last for 2-7 days and for approximately 2 km in distance.

Major features include:

- Prevents buildups of rusts and scales
- Makes cleaning in the kitchen and bathroom much easier (toilets, showers, tiles, joints, etc.)
- Drastically reduces the clogging due to oil balls
- Eliminates the necessity of strong chemicals for removing scales.
- Eliminates the necessity of additives.
- Does not change the water quality.
- Prevents the clogging at the time of drainage

**Test report on Vulcans (pulsed water treatment systems) installed as a preventive measure against scale buildups causing faulty of the cooling towers**

Cooling Tower A

Cooling Tower B

Cooling Tower C



**Developments after installation of the Vulcan**

Adhesion of silica six month after the installation of the Vulcan



water is hosed



after the hosing



Silica is not removed by hosing, but can be peeled off with a nail.

Silica is removed by simply hosing the water. (The remaining silica is peeled off with a touch of a finger.)

The installation of the Vulcan in the circulation line seems to create the status equivalent to the cooling tower C.



**Water quality tests on the cooling tower C**

Quality tests of three types of water approximately six months after the installation of the Vulcan:

- (1) Makeup water
- (2) Circulating water
- (3) Makeup water (raw water)

## Cooling Tower Cost Savings with Vulcan

Japan



### Savings for cooling tower with Vulcan

#### Installation details

<b>Model:</b>	Vulcan S100
<b>Installation Area:</b>	cooling tower for 100RT turbo chiller, 24-hour yearly operation
<b>Circulation Water Capacity:</b>	120 m <sup>3</sup> /h
<b>Pipe Diameter:</b>	150 A
<b>Effect:</b>	chemical treatment reduced

#### Full Chemical-treatment vs. Vulcan-treatment Indicates:

**Under 1 year**, with Vulcan treatment is already less costly than full chemical treatment

#### Cost reduction by Vulcan 10-year warranty:

	without Vulcan	with Vulcan S100	annual savings
	water and electricity charges	water and electricity charges	
	sterilization / anti-algae products	sterilization / anti-algae products	
	anti-scale chemical treatment		
	maintenance cost		
1st year	39,902 USD	35,386 USD	4,561 USD
2nd year	79,804 USD	66,541 USD	13,263 USD
3rd year	119,706 USD	97,700 USD	22,006 USD
5th year	199,510 USD	160,014 USD	39,496 USD
10th year	399,020 USD	315,807 USD	83,213 USD

#### Further benefits

**Electric saving:** about 5-15%, by the scale prevention on the turbo chiller

**Gas saving:** about 5-25%, by the scale prevention on the absorption chiller

**Equipment life extension:** about 30-60%

German Certificates

**TUV NORD**

## Zertifikat

Certificate

**Registrier-Nr.**  
Registered No.  
**44 324 12 409661**

**Zeichen des Auftraggebers**  
Customer's reference  
Herr Christiani

**Auftragsdatum**  
Date of order  
21.06.2012

**Aktenzeichen**  
File reference  
2.4-234/94 Gold/Er

**Prüfbericht Nr.**  
Test report no.  
12324409661 - 002

**Name und Anschrift des Auftraggebers**  
Name and address of the customer  
**Christiani Wassertechnik GmbH  
Köpenicker Str. 154  
10997 Berlin**

ist berechtigt, das unten genannte Produkt mit dem abgebildeten Zeichen zu kennzeichnen

**TUV NORD**  
**GS**  
sicherer  
Sicherheit

**Fertigungsstätte**  
Manufacturing plant  
**Christiani Wassertechnik GmbH  
Köpenicker Str. 154  
10997 Berlin**

**Geprüft nach**  
DIN EN 60335-1:2012-10

Das Produkt entspricht den Anforderungen des Produktsicherheitsgesetzes, ProdSG  
The product is conform with the requirements of the Product Safety Act - ProdSG

**Beschreibung des Produktes**  
(Details s. Anlage 1)

**Wasserbehandlungsgerät**  
Typ Vulcan xxx  
Water treatment equipment  
type Vulcan xxx

**TUV NORD CERT GmbH**  
Zertifizierungsstelle  
Fachstelle Konsumgüter

Bitte beachten Sie auch die umseitigen Hinweise  
Please also pay attention to the information stated overleaf

Langemarkstr. 26 • 40141 Essen • Fon +49 (0)201 825 91-20 • Fax +49 (0)201 825 3208 • E-Mail

## CE Declaration of Conformity

**CE**

**Issuer's name and address:**  
Christiani Wassertechnik GmbH  
Köpenicker Str. 154  
10997 Berlin  
Germany

**Product:**  
Water conditioning appliance

**Type designation:**  
Vulcan  
3000/ 5000/ S10/ S25/ S50/ S100/ S150/ S250/ S350/ S500

The designated product is in conformity with the European Directive:  
**89/336/EEC**  
including amendments  
„Council Directive of May 1989 on the approximation of the laws of the Member States relating to electromagnetic compatibility“.

Full compliance with the standards listed below proves the conformity of the designated product with the essential protection requirements of the above-mentioned EC Directive.

**DIN EN 55014-2 (VDE 0875 Teil 14-2): 2002-08; EN 55014-2:1997 + A1:2001**  
**Requirements of category II**  
**DIN EN 55014-1 (VDE 0875 Teil 14-1): 2003-09; EN 55014-1:2000 + A1:2001 + A2:2002**  
**DIN EN 61000-3-2 (VDE 0838 Teil 2): 2001-12; EN 61000-3-2:2000**  
**DIN EN 61000-3-3 (VDE 0838 Teil 3): 2002-05; EN 61000-3-3:1995 + Corr.:1997 +A1:2001**

The VDE Testing and Certification Institute (EU Identification No. 0366), Merianstr. 28, 63069 Offenbach, has tested and certified the product granting the VDE Approval for the mark(s) as displayed.

**Certificate No.** 94050  
**File Reference** 1898800-4521-0001 / 75684 FG43 / FU

Berlin, 01.01.2018  
(Place, Date)

*Christiani*  
(Legally binding signature of the issuer)

**CWT** Christiani Wassertechnik GmbH  
Köpenicker Str. 154  
10997 Berlin  
Germany

## Clients

Excerpt from our client list worldwide



**Christiani Wassertechnik GmbH (CWT)**  
 Köpenicker Str. 154  
 10997 Berlin  
 Germany

Ph: +49 (0)30 - 23 60 77 8-0  
 Fax: +49 (0)30 - 23 60 77 8-10  
 UK dial: +44 (0)20 - 331 88 638  
 USA dial: +1 917 300 0494

**Web International:**  
[www.cwt-international.com](http://www.cwt-international.com)  
**Web USA / Canada:**  
[www.vulcan-descaler.com](http://www.vulcan-descaler.com)