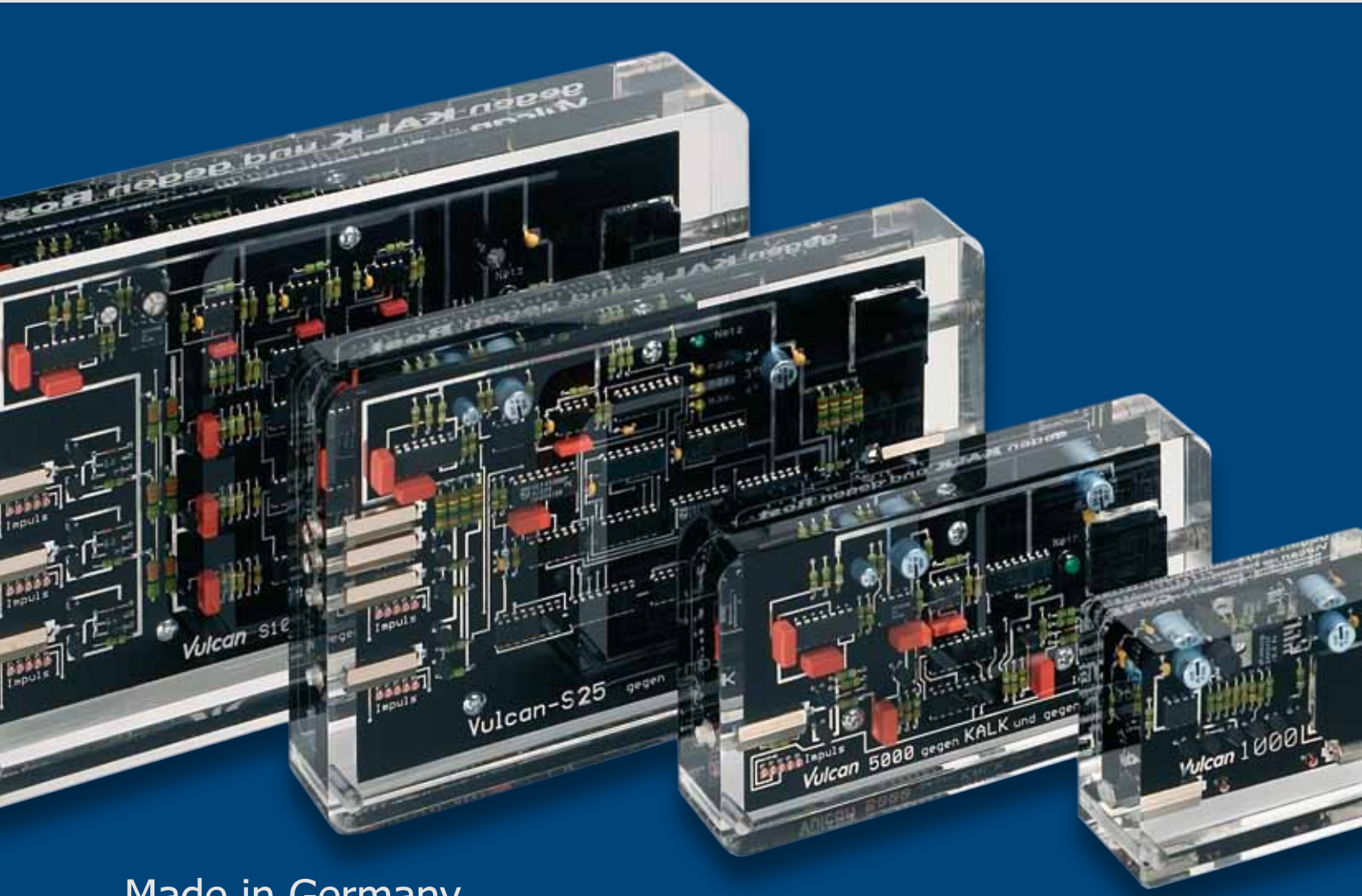
Vulcan

Against scale and rust



Made in Germany

Physical water treatment has over the years successfully proven to be an efficient method to improve the quality of our water without adding chemicals or salt. Nowadays, it has become even more important to capitalize on technologies which do not harm our environment but rather try to create an optimal balance between man and nature.

Vulcan is based on such a technology and is the result of thirty years of constant research and improvements in the field of physical water treatment by Christiani Wassertechnik GmbH (CWT). Our latest product generation continues to provide you with reliable German quality combined with an extensive warranty.

I would like to thank you for your trust in this technology and our expertise in the field of physical water treatment. Many satisfied customers worldwide are the measure of the success of Vulcan which will become apparent also to you.

Rolf Christiani

Graduate Business Engineer
Managing Director CWT

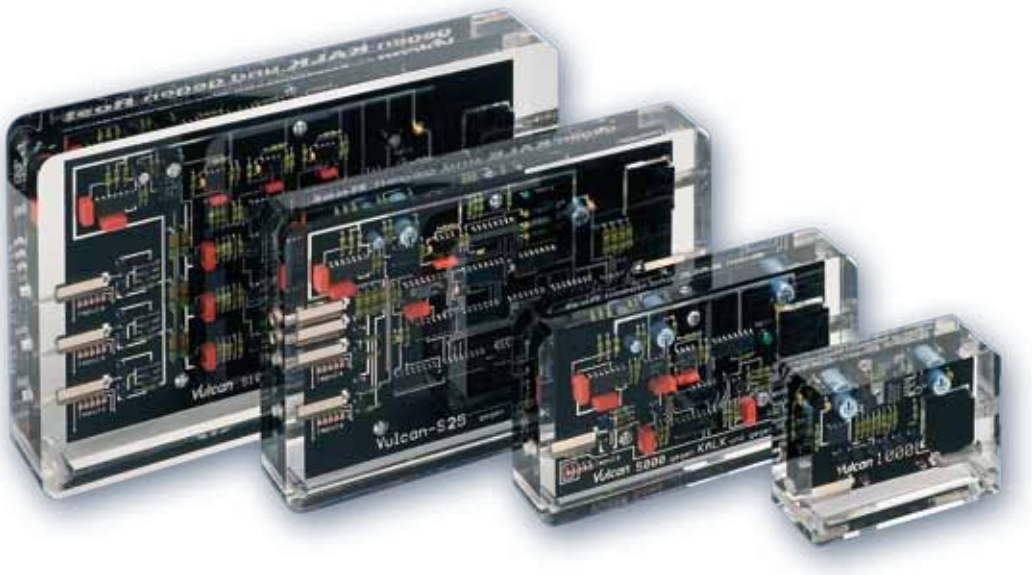
Table of contents

Vulcan – Against Scale and Rust

Vulcan provides you with an eco-friendly water treatment system which protects your water pipes and equipment against scale and rust. The method is based on the patented Vulcan-Impulse-Technology and treats your water without applying any chemicals or salt. Special electronic impulses change the crystallization process of the calcium in hard water causing the particles to lose their ability to stick to surfaces.

- **Important minerals remain in the water**
- **Maximum working life of machinery and equipment**
- **Reduction of scale deposits in the whole piping system**

Vulcan is a customized solution for your individual needs.
The various product lines of Vulcan solve individual problems in private use, commercial applications or in industrial settings.



Benefits

- Eco-friendly solution without chemicals or salt
- Easy installation without cutting the pipes
- Works on every pipe material – iron, copper, plastic, stainless steel
- Appliband on pipe diameters of $^{1}/_{2}$" to 20" (~ 10 - 500 mm)
- Long-life fully cast in acrylic
- Maintenance-free

CWT Quality - Made in Germany

- Over 30 years of experience in physical water treatment
- International 10-year product warranty
- More than 150,000 satisfied customers world-wide
- Tested by independent institutes
- TÜV Nord and CE certified

The Scale Problem

The water we use in our private homes as well as in commercial and industrial facilities contains dissolved scale consisting of calcium and magnesium. When exposed to a temperature increase or change of pressure, the calcium crystallizes on surfaces producing incrustations. These hard scale deposits appear in places where water is heated, swirls around or leaves the pipes.

Scale deposits on the inside of pipes, on heating elements or on expensive machinery create many problems, the most common of which are:

- **Loss of energy due to a longer heating process**
- **High costs of repairs and maintenance on machines and equipment**
- **Loss of water pressure due to decreased pipe diameters**
- **High cleaning costs and the need of aggressive cleaning agents**
- **Decrease in overall industrial productivity**

The longer you wait to take action against these problems, more damages and costly repairs will arise. Soon you will have to replace the whole piping system and buy new equipment.



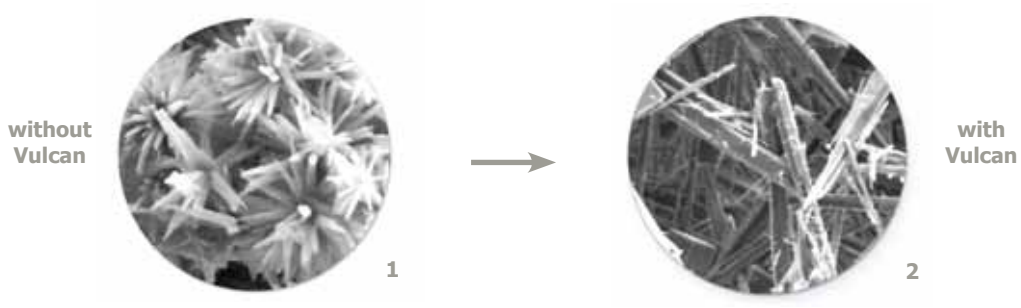



The 3 Vulcan Effects

- ✓ **Vulcan stops scaling on surfaces**
- ✓ **Vulcan sanitizes the piping system**
- ✓ **Vulcan protects against rust and corrosion**

1. Vulcan stops scaling on surfaces

Vulcan-based water treatment does not change the original water quality but modifies the crystallization of the scale. When exposed to a temperature increase or change of pressure, the calcium in hard and untreated water crystallizes into a burr-like structure (pic.1). These structures stick to each other, adhere to surfaces and thus produce solid scale deposits within a short period of time.



Making use of the natural process of electrophoresis, the patented Vulcan-Impulse-Technology modifies the crystallization of calcium and magnesium. As a result, the calcium in Vulcan-treated water crystallizes forming "inoffensive" mono-crystal rods (pic.2). These crystal rods cannot attach to each other and are washed away with the water in the form of fine powder.

$Ca(HCO_3)_2$ (Calciumhydrogen-carbonate) + Vulcan (Impulse) → $CaCO_3$ (Crystal rod) + CO_2 (Carbon dioxide) + H_2O (Water)

2. Vulcan sanitizes the piping system

Two processes happening simultaneously take place in untreated, hard water. In the first process scale deposits build up when scale crystals connect to each other, which produces carbonic acid. In the second process the carbonic acid then resolves existing scale deposits - a phenomena called the "natural resolving process". As the incrustation process is much faster than the natural resolving process, the pipe's diameter constantly decreases (pic.3).

without Vulcan

3

4

with Vulcan

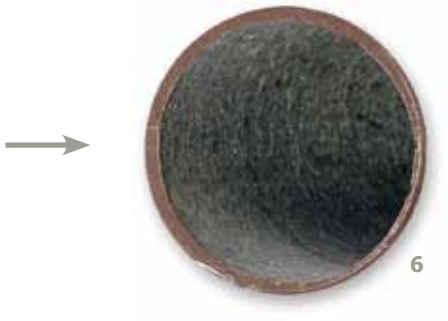
Vulcan protects the pipes against new incrustations: with Vulcan the natural scale resolving process only has to deal with the already existing calcifications. New incrustations do not disturb the process of scale removal any longer and the pipe gets gradually cleaned (pic.4). As carbonic acid can only dissolve scale from scale but not scale from the pipe, a thin protective layer always remains on the inside of the pipe.

3. Vulcan protects against rust and corrosion

When the pipe comes into contact with aggressive, hard water, an oxidation process takes place. This happens especially to pipes made of copper, iron or galvanized steel (pic.5). This damage by rust and oxidation seriously affects the pipe surface and produces pitting corrosion.

without Vulcan

5



6

with Vulcan

The Vulcan-Impulse-Technology generates a controlled electrophoresis which produces a protective metal-carbonate layer. According to the pipe material, this layer consists of copper-carbonate, iron-carbonate or zinc-carbonate and settles on all blank surfaces. Vulcan also decreases the oxidation reduction potential (ORP). This weakens the reaction between dissolved oxygen with other substances in the water. The rusting process is therefore minimized.

Private Line – Vulcan 3000 and Vulcan 5000

The Vulcan Private Line devices have been designed to protect the piping system in private houses and small commercial equipment, such as coffee machines and dishwashers. These units can easily be installed within a few minutes.

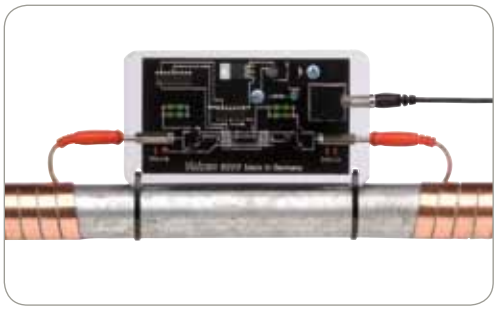
Application areas

- **Houses**
- **Apartments**
- **Swimming pools**
- **Machinery**
- **etc.**

Vulcan 3000

Capacity	3000 l/h (~793 gal/h)
Maximum pipe diameter	$1^1/_2$" (~38 mm)
Wattage	2.0 Watt
Impulse bands	2 x 0.5 m
Required space	250 mm

Vulcan 5000



Capacity	5000 l/h (~1325 gal/h)
Maximum pipe diameter	2" (~50 mm)
Wattage	2.0 Watt
Impulse bands	2 x 1 m
Required space	350 mm

Benefits of the Private Line

Reduction of scale deposits throughout the whole piping system

Faster cleaning of your kitchen and bathroom

Considerable savings in washing and cleaning agents

Eco-friendly method without chemicals or salt

Important minerals remain in the water

Less time and effort spent on repairs and maintenance at your home, e.g. water heaters, washing machines, etc.

Commercial Line – Vulcan S10, Vulcan S25 and Vulcan S100

The Commercial Line devices operate at a capacity of up to 100 m^3/h (~440 gpm) and have been designed to perfectly meet the requirements of small and large commercial facilities. These programmable units allow for individual adjustment according to the materials and diameters of the pipes.

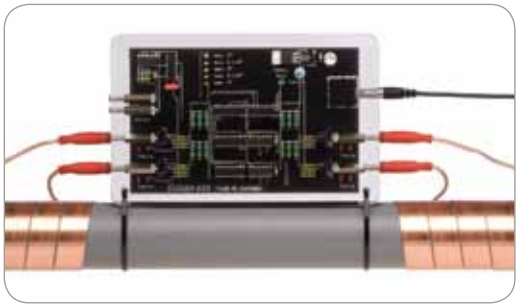
Application areas

- **Hotels**
- **Apartment complexes**
- **Agriculture**
- **Golf courses**
- **Fitness clubs**
- **etc.**

Vulcan S10

Capacity	10 m^3/h (~44 gpm)
Maximum pipe diameter	3″ (~76 mm)
Wattage	2.25 Watt
Impulse bands	2 x 1 m
Required space	500 mm
Programs	3

Vulcan S25



Capacity	25 m^3/h (~110 gpm)
Maximum pipe diameter	4″ (~100 mm)
Wattage	2.25 Watt
Impulse bands	4 x 2 m
Required space	600 mm
Programs	5

Vulcan S100

Capacity	100 m^3/h (~440 gpm)
Maximum pipe diameter	6″ (~150 mm)
Wattage	2.5 Watt
Impulse bands	6 x 4 m
Required space	1200 mm
Programs	10

Benefits of the Commercial Line

Savings due to more efficient use of energy for heating water

Maximum working life of commercial machinery and equipment

Less time and effort spent on cleaning

Reduced maintenance work on irrigation systems and water tapping

Food and beverages keep their natural taste

More reliable water supply within sanitary facilities

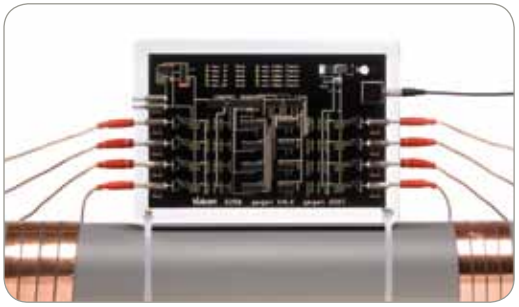
Industrial Line – Vulcan S250 and Vulcan S500

The large Vulcan devices operate at a capacity of up to 500 m^3/h (~2200 gpm) and have been designed to provide solutions for all kinds of applications in light and heavy industries. The customized adjustment to pipe diameters and pipe materials is based on 10 different system-integrated programs.

Application areas

- **Cooling towers**
- **Heat exchangers**
- **Food industry**
- **Hospitals**
- **Refineries**
- **etc.**

Vulcan S250



Capacity	250 m^3/h (~1100 gpm)
Maximum pipe diameter	10” (~250 mm)
Wattage	2.75 Watt
Impulse bands	8 x 10 m
Required space	2500 mm
Programs	10

Vulcan S500

Capacity	500 m^3/h (~2200 gpm)
Maximum pipe diameter	20” (~500 mm)
Wattage	3.25 Watt
Impulse bands	10 x 30 m
Required space	5000 mm
Programs	10

Benefits of the Industrial Line

Easy cleaning and no need to apply acids in cooling towers

Inexpensive installation without interruption of the production process

Productivity increase due to the reduction of lime incrustations

Maximum working life of expensive production facilities

Inexpensive solution without application of chemicals and salt

Fast amortization of acquisition costs

Frequently Asked Questions

Which pipe materials are the devices suitable for?
The devices are suitable for all pipe materials: copper, iron, stainless steel, plastic and compound pipes.

Do copper or synthetic pipes need a scale protection device at all?
Yes. Copper and plastic pipes are prone to calcifications, too. The smoother a surface is the longer it can resist the process of calcification, but once a first layer of scale has built up, the incrustation process proceeds just as fast as on any other surface.

Does the Vulcan treatment have a softening effect on the water?
As the water treated by Vulcan does not lose any essential minerals, such as calcium and magnesium, the composition of the water remains unaltered. It feels noticeably softer, though. You are sure to feel this effect when showering or washing your hair. The treatment does not, however, change the measured water hardness.

How long does it take Vulcan to sanitize the pipes?
Vulcan removes scale and rust slowly without negatively affecting the pipes. The cleaning process takes about as long as it took the incrustations to develop. A faster removal would inevitably block up the pipes and may even destroy them.

Up to which degree of water hardness can Vulcan be applied?
Vulcan operates within a high performance frequency range. It can thus be successfully applied even on water with a particularly high degree of hardness.

How can I find out if Vulcan operates efficiently?
Red pilot lights at the band outputs indicate that the impulse generator is operating efficiently. In case these lights are not illuminated, please check the power supply voltage.

Which voltage range is the electronic plug-in power supply unit suitable for?
All Vulcan power supply units are suitable for voltage ranges between 87 Volt – 260 Volt and 50 Hz – 60 Hz.

What are the power costs of Vulcan per year?
Vulcan is completely maintenance-free. The cost of electric energy per year amounts to approximately 2 to 6 Euro (US $ 3 - 7).

Installation Notes

1. Protect the power supply unit against exposure to direct water.
2. Use the included switching power supply unit only.
3. Do not cut the impulse bands nor the 24 V power cord of the power supply unit.
4. Do not remove the end caps or the impulse band insulation.
5. The operating temperature of Vulcan ranges from –10° C to +50° C (14° F to 122° F).
6. Clean the device with water only.
7. Temperature peaks on heating element surfaces should not exceed 95° C (203° F).

Installation Examples

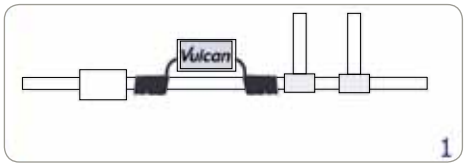
1. For optimal water treatment Vulcan is best installed near the water meter or at the main water supply (pic.1).

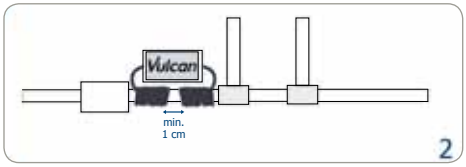
2. The impulse band windings can be placed on the left side, on the right side or underneath the electronic device. Leave a safe distance of at least 1cm ($^1/_2$″) from each other (pic.2).

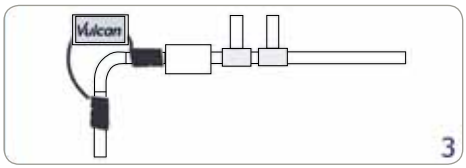
3. Vulcan can be installed vertically, horizontally or at any other angle. If there is no space available on the pipe the device can also be wall-mounted (pic.3).

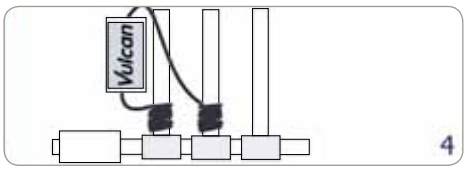
4. In case of limited space the windings can be placed partly on the main pipe and partly on the distributor pipe (pic.4).

All these different installations are possible because the treatment impulses extend over several meters to either side of the pipes.









Installation Instructions - Private Line

1. Put the two band holders through the fixing holes at the bottom of the electronic device. Now place the device onto the pipe. Use the band holders to latch the device to the pipe.

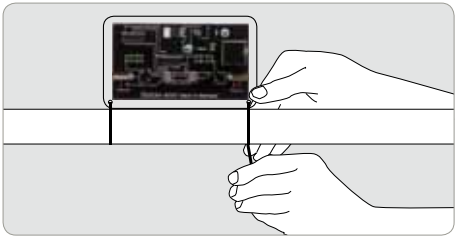
2. Connect one of the impulse bands to the device and use another band holder to latch it to the pipe.

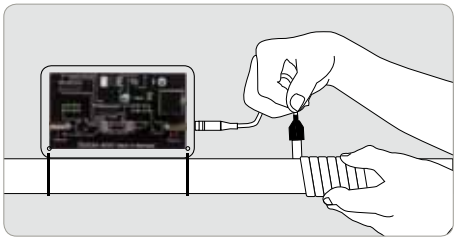
3. Wind the impulse bands around the pipe producing a coil. Make sure you wind the band tightly to the pipe and place the windings close to each other.

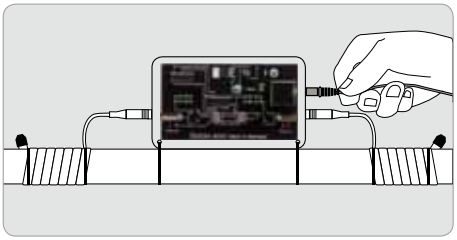
4. Latch the end of the band to the pipe using another band holder. Now repeat the procedure with the second impulse band.

5. First plug the connector into the upper right in-jack of the device and then connect the power supply unit with an electrical outlet.

6. The red pilot lights will illuminate as soon as the device starts to operate. Vulcan works from now on maintenance free.

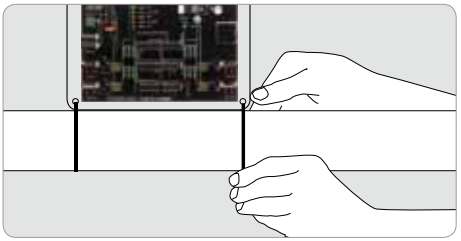






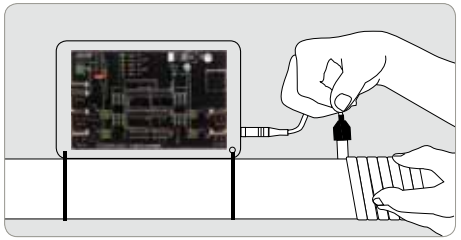
Installation Instructions - Commercial Line and Industrial Line

1. Put the two band holders through the fixing holes at the bottom of the electronic device. Now place the device onto the pipe. Use the band holders to latch the device to the pipe.



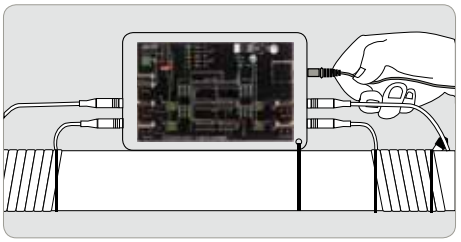
2. Plug one of the impulse bands into the bottom impulse band in-jack and latch it to the pipe using another band holder.

3. Wind the impulse band around the pipe producing a coil. Make sure you wind the band tightly to the pipe and place the windings close to each other.



4. Latch the end of the band to the pipe using another band holder. Now plug another impulse band into the in-jack on the opposite side and repeat the procedure.

5. Plug another impulse band into the next impulse band in-jack and, according to the device type, repeat steps 2 - 4 until all impulse bands are in use. All impulse bands must be wound tightly around the pipe and fastened with band holders.

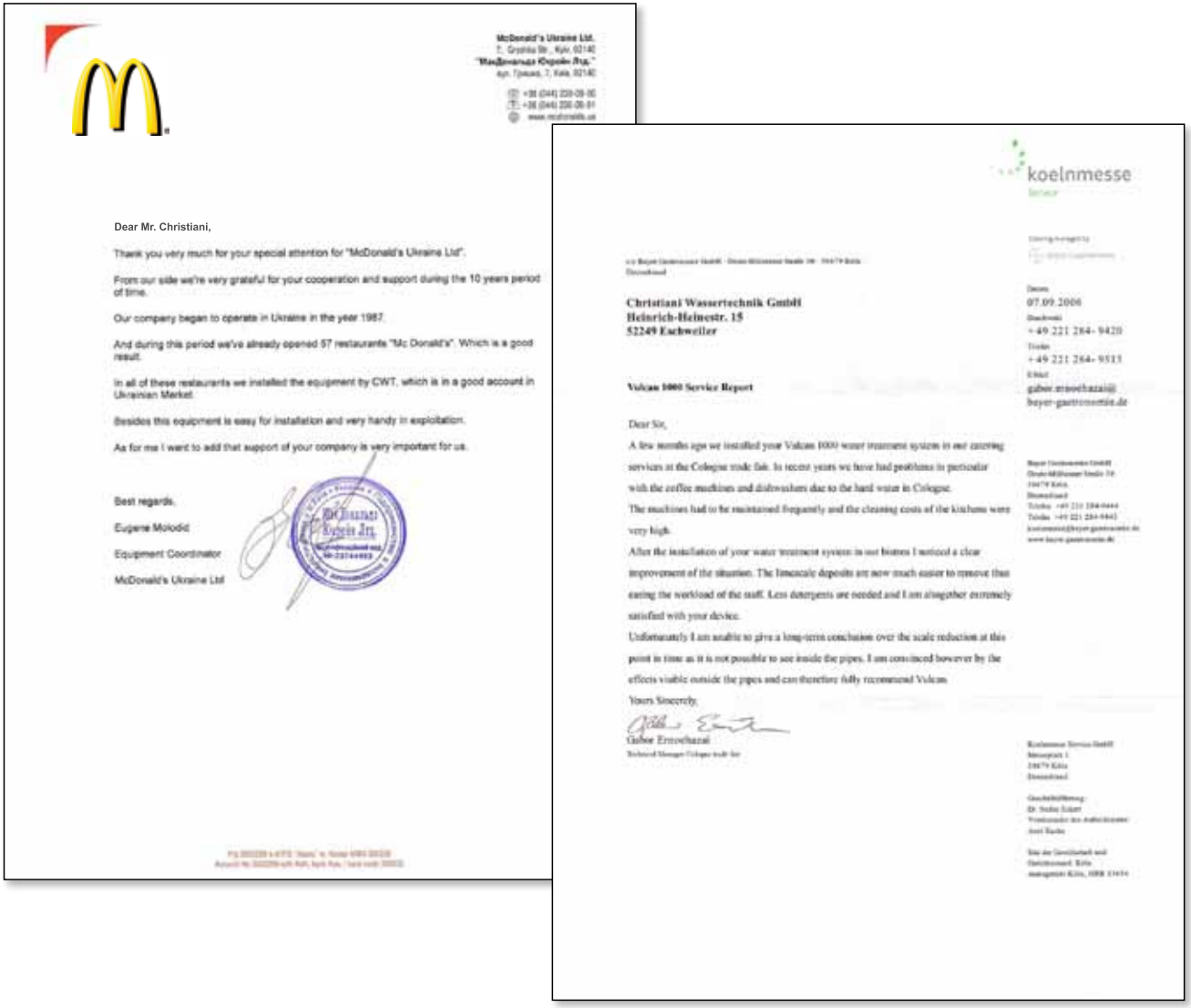


6. First plug the connector into the upper right in-jack of the device and then connect the power supply unit with an electrical outlet.

7. Now adjust your Vulcan on the side sensors according to your pipe diameter to optimally treat your water.

References

These references show a selection of the many letters of recommendation we have received from satisfied customers.



McDonald's Ukraine Ltd.

Dear Mr. Christiani,

Thank you very much for your special attention for "McDonald's Ukraine Ltd".

From our side we're very grateful for your cooperation and support during the 10 years period of time.

Our company began to operate in Ukraine in the year 1997.

And during this period we've already opened 57 restaurants "Mc Donald's". Which is a good result.

In all of these restaurants we installed the equipment by CWT, which is in a good account in Ukrainian Market.

Besides this equipment is easy for installation and very handy in exploitation.

As for me I want to add that support of your company is very important for us.

Best regards,

Eugene Molodid

Equipment Coordinator

McDonald's Ukraine Ltd

koelnmesse

Christiani Wassertechnik GmbH
Heinrich-Heinestr. 15
52249 Eschweiler

07.09.2006

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+49 221 284- 9513

Vulcan 1000 Service Report

Dear Sir,

A few months ago we installed your Vulcan 1000 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 homes 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 Ertvelhazai

Mercure

Leopoldstr. 120 • 80802 MUENCHEN • GERMANY

Christiani Wassertechnik GmbH
Heinrich-Heine-Straße 15
52249 Eschweiler

Re: physical water treatment unit Vulcan S 100

Munich, November, 9th 199

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 in july 1995.

Only a short time after that we observed that we no longer needed acetic or asorbic acid in order to clean the perlators and shower heads in out hotel, which has more than 65 guests rooms, since the chalk that builds up now is no more than a layer which is easy to wipe of Due to the fact that the efforts employed at maintaining the sanitary facilities can be kept t a minimum, and resulting from the smaller electricity consumption, we are able to econo-mise. 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 outpup 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 allways be a pleasure for us to recommend your company an your produc to other clients.

Sincerely yours

Horst Schneider
Director

Bediente Gastronomie

Mövenpick Restaurant Sanssouci, Zur Historischen Mühle 2, D-14469 Potsdam

Firma
Christiani Wassertechnik GmbH
Charlottenstraße 18

10117 Berlin

MÖVENPICK
Restaurants

8. Dezember 2006

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 calcifications 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 results 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 Chartier
Director

Mövenpick Zur Historischen Mühle Sanssouci
Zur Historischen Mühle 2
14469 Potsdam
Tel.: 0331 / 28149 3
Fax 0331 / 281 49 90

Mövenpick Restaurant Zur Historischen Mühle Sanssouci, Zur Historischen Mühle 2, D-14469 Potsdam,
Phone +49 (0)331 28149-3, Fax +49 (0)331 28149-80, Direktor: Marcel Chartier
E-Mail: restaurant.potsdam.sanssouci@moevenpick.com, www.moevenpick.com

Excerpt from our Client List

Alcatel

Bayer-Leverkusen

BOSCH

DaimlerChrysler

Dynamit Nobel

Hyatt Hotels

McDonald's

Mövenpick

SHELL

Siemens

Starbucks

Universität München

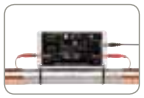
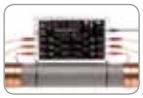
Viessmann

Volkswagen

CWT

Water as it should be

Technical Data

	Private Line		Commercial Line			Industrial Line	
	***Vulcan* 3000**	***Vulcan* 5000**	***Vulcan* S10**	***Vulcan* S25**	***Vulcan* S100**	***Vulcan* S250**	***Vulcan* S500**
							
Capacity	3000 l/h (~ 793 gph)	5000 l/h (~ 1325 gph)	10 m³/h (~ 44 gpm)	25 m³/h (~ 110 gpm)	100 m³/h (~ 440 gpm)	250 m³/h (~ 1100 gpm)	500 m³/h (~ 2200 gpm)
Maximum pipe diameter	1 1/2″ (~ 38 mm)	2″ (~ 50 mm)	3″ (~ 76 mm)	4″ (~ 100 mm)	6″ (~ 150 mm)	10″ (~ 250 mm)	20″ (~ 500 mm)
Voltage	24 Volt	24 Volt	24 Volt	24 Volt	24 Volt	24 Volt	24 Volt
Wattage	2.0 Watt	2.0 Watt	2.25 Watt	2.25 Watt	2.5 Watt	2.75 Watt	3.25 Watt
Impulse bands	2 x 0.5 m (~ 2 x 1′ 8″)	2 x 1 m (~ 2 x ~ 3′ 3″)	2 x 1 m (~ 2 x ~ 3′ 3″)	4 x 2 m (~ 4 x 6′ 7″)	6 x 4 m (~ 6 x 13′ 2″)	8 x 10 m (~ 8 x 32′ 9″)	10 x 30 m (~ 10 x 98′ 5″)
Band width	10 mm (~ 0.4″)	10 mm (~ 0.4″)	20 mm (~ 0.8″)	20 mm (~ 0.8″)	20 mm (~ 0.8″)	20 mm (~ 0.8″)	20 mm (~ 0.8″)
Measurements	80/130/30 mm (~ 3.1/5.1/1.2″)	85/150/30 mm (~ 3.3/5.9/1.2″)	120/190/40 mm (~ 4.7/7.5/1.6″)	125/200/40 mm (~ 4.9/7.9/1.6″)	150/240/40 mm (~ 5.6/9.4/1.6″)	200/295/50 mm (~ 7.9/11.6/2.0″)	220/320/50 mm (~ 8.7/12.6/2.0″)
Frequency range	3-32 kHz	3-32 kHz	3-32 kHz	3-32 kHz	3-32 kHz	3-32 kHz	3-32 kHz
Required space	250 mm (~ 10″)	350 mm (~ 1′ 2″)	500 mm (~ 1′ 8″)	600 mm (~ 1′ 12″)	1200 mm (~ 3′ 11″)	2500 mm (~ 8′ 3″)	5000 mm (~ 16′ 5″)
Programs	1	1	3	5	10	10	10

Electronic Switching power supply unit

In	87-260 Volt 50-60 Hz	87-260 Volt 50-60 Hz	87-260 Volt 50-60 Hz	87-260 Volt 50-60 Hz	87-260 Volt 50-60 Hz	87-260 Volt 50-60 Hz	87-260 Volt 50-60 Hz
Out	24 Volt 600 mA	24 Volt 600 mA	24 Volt 600 mA	24 Volt 600 mA	24 Volt 600 mA	24 Volt 600 mA	24 Volt 600 mA

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