GRANDER

INDUSTRY JOURNAL

CONTENT

Peter Ortner
U.V.O. – the Grander Sales Organisation

Clear water for industry

An asset for companies and an opportunity for the environment

Never in our wildest dreams did we dare to believe, in the early days of developing the Johann Grander water revitalising system, that we could ever produce a brochure such as the one you are currently reading. The success story of the Grander water revitalising system and its worldwide presence is, first and foremost, based on the experience of satisfied private users. Water revitalisation has been around for over half a decade and has recently expanded its horizons. It is a sector, in which measurements are exact and calculations are accurate. It may amaze you to learn that industry technicians, to a greater or lesser extent, try to avoid using chemicals, replacing them with the Grander water revitalising system. We are not that surprised, since we have seen many technically-oriented individuals with science backgrounds, who originally doubted and were suspicious of our claims, endorse our product or even become our partners. It is also one of our proud boasts that leaders in many areas of the sector carry out experiments using revitalised water. After successful private applications using revitalised water, they wanted to know if Grander would be able to broaden its horizons. The multitude of different applications, ranging from the production of plastics to assembling cars, from glass-making to brewing beer and from preparing leather to cheesemaking, to name but a few, would never have been possible, without companies being proactive, having a pioneering spirit and being keen to experiment. We, therefore, gratefully acknowledge their contribution and thank them for sharing their results and experiences with us. For most companies, Grander water revitalisers are used not only for technical and scientific purposes, but also for environmental protection, to reduce the strain placed on water resources. Just as industry has benefited from the experiences of the private user, so can private users profit from the measurable results of industry.

Of course, this brochure can only provide an initial, incomplete snapshot. The companies are above suspicion, since any claims they make can easily be checked. We, therefore, have no hesitation in presenting you with their experiences regarding the use of water revitalisers from Johann Grander in industrial and commercial applications.

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2_

Information
Grander used since 2005

Allgäuland-Käsereien GmbH
Theodor-Aufsberg-Straße 10
D-87527 Sonthofen
www.allgaeuland.de

1_ 50% savings on chemicals and 20% on water in cleansing machines

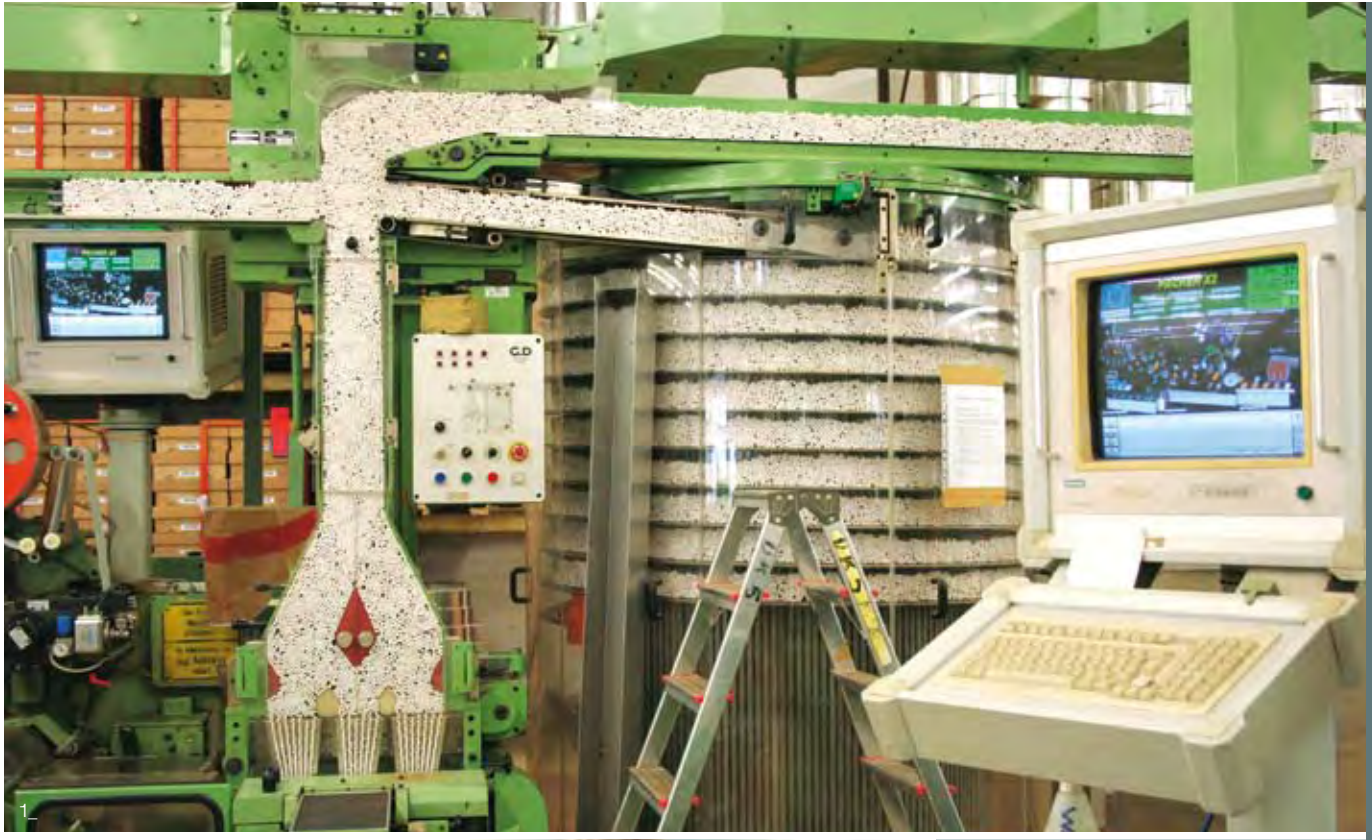
2_ Operations director Karl-Michael Grueber has confidence in the Grander effect

A better cleaning agent

The Allgäuland-dairies in Sonthofen uses Grander for its cleaning

The products made by Allgäuland-dairies GmbH are guarantees of slices of special treats. Emmental, Parmesan and mature cheeses, milk and fresh products - the list of their specialities is almost endless and recently tofu became the latest addition to their shelves. Allgäuland-Käsereien was originally founded as a consortium of dairy cooperatives with the aim of uniting their skills and know-how in terms of dairy production into a professional unit dealing with everything from processing to marketing. Out of a regional dairy cooperative was born a company that is now active on the international stage. The company is one of the ten largest milk processing companies in Germany and is now over 106 years old. However, the quality of its raw material, milk, the technical know-how of the cheesemakers and hygiene are still decisive factors in terms of the success of the end product.

After successfully trialling the product in his own home, Karl-Michael Grueber, operations director at Allgäuland-Käsereien in Sonthofen, started to use Grander in the plant. “At home, I had noticed that there was much less limescale. I wanted to use the Grander revitalised water system in the plant to save on chemicals and water in the cleaning process,” he confirms. Since 2005, revitalised water has been flowing through the cleaning systems used to clean the tanks and pipes. The result – “we have made savings of 50% in terms of chemicals and 20% in terms of water, because revitalised water is a better cleaner. This has meant a reduction in operating costs of around 7,000 euros a year,” reckons Grueber. The concentration of our nitrous cleaning agent has dropped from 1.3% to 0.7% in eight or nine months. Grueber’s final words on the subject: “I believe that the Grander water revitalisation system is very effective in our sector.”



1_ Austria Tabak is the largest cigarette manufacturer in Austria

2_ Director Martin Haberfelner: 40% savings on chemicals

Information
Grander used since 2000

Austria Tabak GmbH
Koppstraße 116
A-1160 Wien
Tel.: +43 (0) 1 / 313 42-0
Fax: +43 (0) 1 / 313 42-1636
www.austriatabak.com

Revitalised air-conditioning system

Austria Tabak saves around 40,000 euros in operating costs every year

The Austria Tabak plant in Hainburg, Lower Austria, produces 13 billion cigarettes every year. It was founded in 1784 as a state company, by Kaiser Joseph II. In 1997, it was partially privatised and quoted on the Vienna Stock Exchange and, by the middle of 2001, was bought by the Gallagher Group Plc. Since April 2007, Austria Tabak has belonged to the JTI consortium and is, therefore, part of Japan Tobacco – the third largest tobacco company in the world.
The Grander water revitalisation system was first used in 2000, when, for test purposes, an air-conditioning system was chosen for the Fürstenfeld plant. In the interior production workshop rooms, air-conditioning systems ensure a constant room temperature of 22 degrees Celsius and 60% relative humidity. These systems renew and purify the air in the rooms, control temperature and regulate the humidity. The air is cleansed and humidified using revitalised water, by creating a mist. In order to prevent algae growth and contamination of the air-conditioning systems, water is mixed with chemicals.

After a Grander water revitalisation system was installed, the company was able to reduce significantly the quantity of chemicals used and greatly increase the cleansing intervals. Excellent test results meant that the use of the Grander revitalisation system was expanded, with seven of these systems providing clean air for the production workshops at Hainburg, circulating 450,000 m3 of air every hour. “In 2003, around 100,000 euros was invested in chemicals for use in air-conditioning systems, whereas, after using the Grander water revitalisation system, we made annual savings of 40%,” reckons Director Martin Haberfelner, who is responsible for energy matters at Austria Tabak.
The company’s headquarters in Vienna are also now using the Grander water revitalisation system after its success in Hainburg since 2005. In addition to the air-conditioning systems, revitalised water is now installed in all the drinking water systems so that employees can enjoy revitalised water.

1_ Boxmark makes leather products for the automotive and furniture sectors and for the clothing industry

2_ Centre manager: Josef Neubauer: The Grander water revitalisation system is the optimum alternative to chemicals

Selective leather cutting

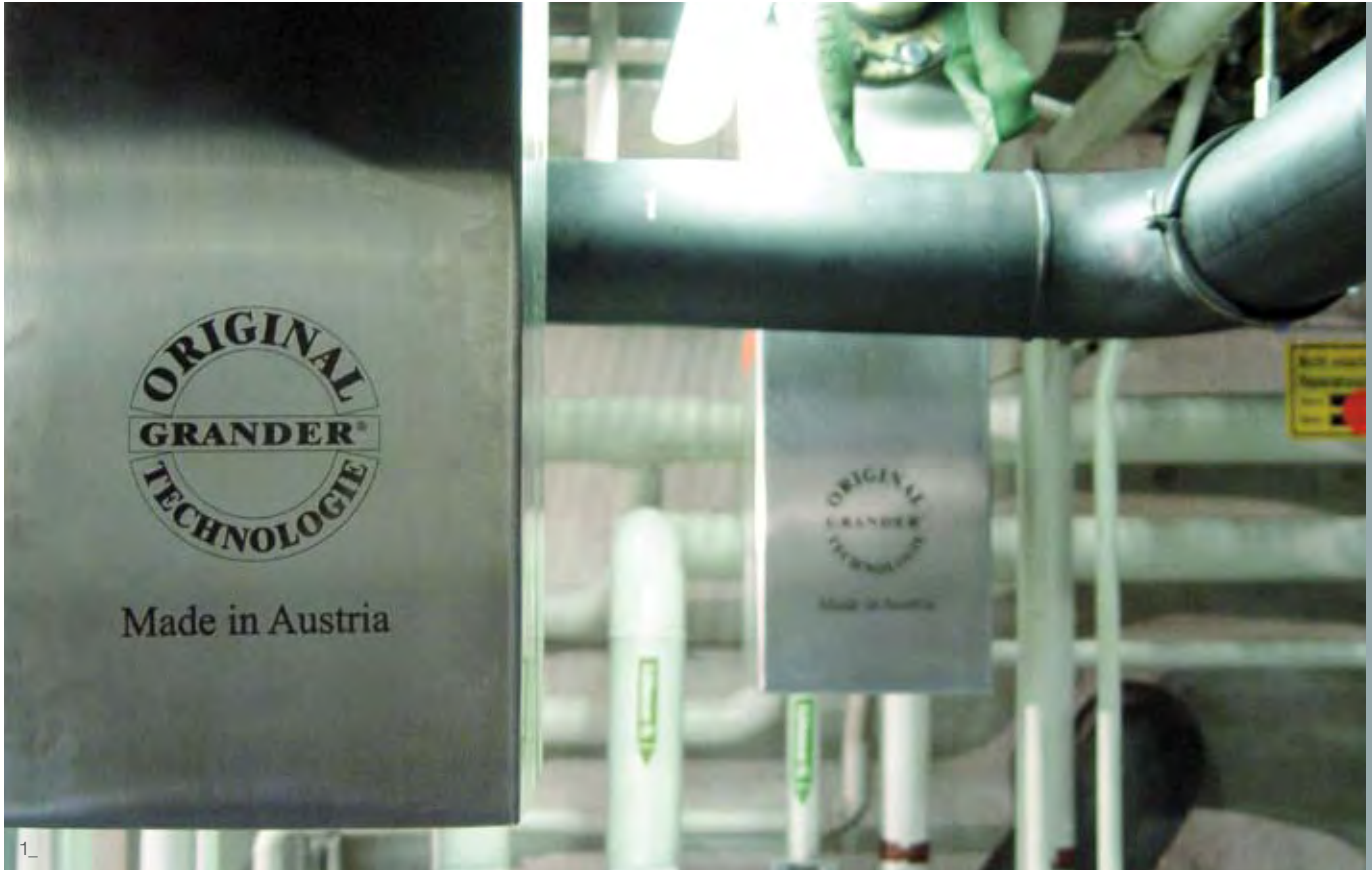
A lot of water is needed when processing leather, but water can also be an unmanageable commodity. Boxmark Leather optimised their manufacturing process using Grander.

Boxmark Leather has its company headquarters at Feldbach in Styria and, from there, manufacture and distribute worldwide around 12,400km2 of high quality upholstery leather made exclusively from cattle hide for the automotive and furniture sectors. Boxmark supplies clients such as Audi, Bentley, Daimler, Lamborghini, Poltrona Frau (an Italian furniture company), Porsche, VW, Viennese workshops and many more. Splitting the leather into two surfaces is an important stage in the production of leather. Boxmark processes the shagreen side, which is then turned into suede and ready-to-use leather for shoes, handbags, clothes and accessories. This is where the Grander water revitalisation system comes in.

The revitalised water is used in the cutting machine's washing system and in the open cooling systems. The cutting machine is a precision instrument, which splits the cattle hide with accuracy of 0.2 to 0.3mm. If the water quality is poor, the leather is split unequally, i.e. there is more wastage. The machine is supplied with 6m3 of water every hour. "The splitting machine was calcifying, although we were using chemicals. The water was so hard that it affected the accuracy of the band knife," describes centre manager, Josef Neubauer. He started looking around for an alternative and, since 2003, it has been revitalised water that has been flowing through the washing system. There are hardly any lime-scale problems and the quantity of chemicals used was significantly reduced. "For every cubic centimetre of water, we need 30% chemicals. We saved up to 100% here, making an annual saving of 2,500 euros," confirms Josef Neubauer, providing evidence of an extra benefit, in addition to an improved production process.

Information
Grander used since 2003

Boxmark Leather GmbH & CoKG
Europastraße 11
A-8330 Feldbach
E-Mail: office@boxmark.com
www.boxmark.com



1_ Grander in use at Daimler

2_ Water quality in the cooling process: clear and free of chemicals

Clear and free of chemicals

Daimler AG's Mercedes-Benz vehicles assembly plant at Wörth is saving chemicals and water by using Grander.

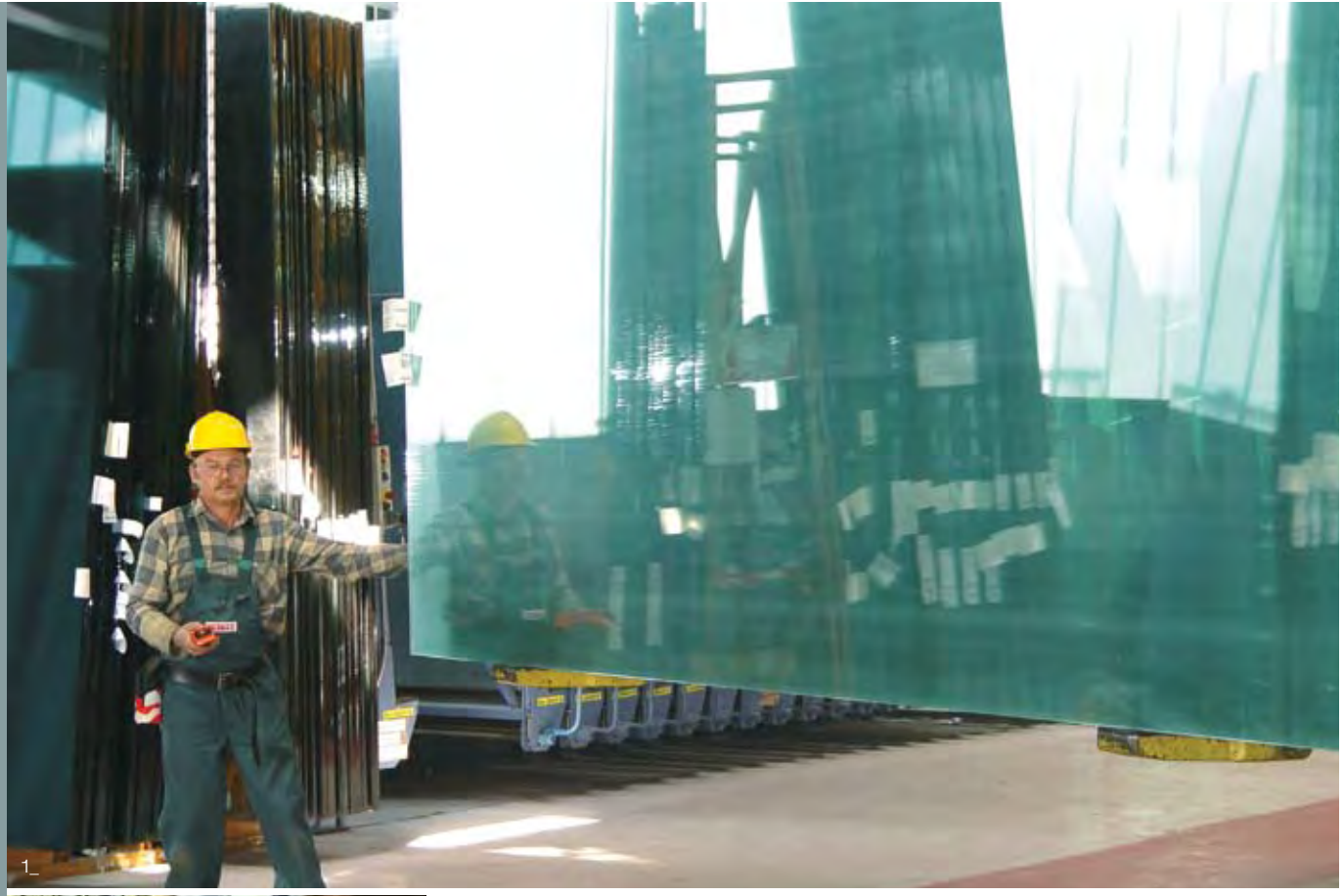
Daimler Ag operates the largest vehicle assembly plant in the world at Wörth am Rhein. For over forty years, vehicles with prestigious names such as Atego, Actros and Axor have been rolling off the production lines. The product palette includes light, medium and heavy-duty vehicles for long-distance, distribution and construction usage, as well as specialist vehicles such as the Unimog and the Econic. In recent years, the already successful company has been selling more vehicles than before.

By using the Grander revitalisation water system in its cooling systems, the company has been able to reduce the use of chemicals and save on operating costs. Previously, corrosion and bacteria were removed using biocides and stabilisers. The plant's cooling system is open and is used to cool air compressors and machinery. Compressors heat up the air, which then has to be cooled to normal temperatures for operations. This is a problem as each season goes by. In the Spring, pollen falls into the open cooling system, whereas, in the Summer, the extreme heat represents a real danger.

Revitalised water has been used for seven years now in the plant's cooling systems. Chemicals are hardly ever required, resulting in huge savings in terms of operating costs last year.

Information
Grander used since 2003

Mercedes-Benz Werk Wörth
Daimlerstraße 1
D-76744 Wörth (Rheinland-Pfalz)
www.daimler.com



1_ Eckelt Glas manufactured the explosion-proof glass for the new World Trade Center in New York

2_ Heinz Baumgartner checks the filters. Since the Grander water revitalisation system has been introduced there is hardly any glass dust

Happiness is clear glass

When making glass, Eckelt Glas swears by Grander

Since 1989, the company has been a subsidiary of the French global company, Saint-Gobain, the world's leading consortium in terms of glass production and heat insulation. Saint-Gobain is one of the 100 largest industrial groups in the world and is active in the business areas of glass systems, design, heat insulation, safety, sun protection and interiors. The company has also broken new ground with its entirely innovative symbiosis of plastic and glass. Along with others, Eckelt Glas produced explosion-proof glass for the Seventh World Trade Center in New York. The company had to meet the enormous safety requirements and supply a special glass solution for the entrance area of the world's safest skyscraper.

The Grander revitalised water system has been used in the grinding and rinsing processes involved in the production of glass since 2003. Water is needed to polish cut edges, remove dirt and cool working materials. "Dirt and dust found their way into the machines during the production process and it was always difficult to get rid of them", reports Heinz Baumgartner, who looks after maintenance. Glass dust, which collects in the pumps and filters, can be cleaned and removed much more easily with the Grander revitalised water system. Previously, filters were used three to four times, now they are used twenty times. "The executive's decision to use Grander water revitalisers was surely the right way to go," says Baumgartner. "We were able to save on flocculants, cleaning processes were optimised and water quality improved markedly," he added.

Information
Grander used since 2003

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www.eckelt.at

Putting the flags out

Fahnen-Gärtner in Mittersill are using Grander to improve process water

1_ Creatively-stitched military and company banners

2_ Gerald Heerdegen: An opportunity to help the environment

3_ 100,000 banners, plus 30,000 national and international flags created every year by screen or digital printing

The company's main product lines are banners, flags and creatively-stitched banners for the military and companies. Additionally accessories such as masts and small articles such as pennants and emblems complete the range. The flags and banners that leave Mittersill adorn the palace of the Federal president and government buildings. Parishes, commercial and industrial premises as well as hotels and gastronomic outlets are amongst the company's preferential clients. Every year, 100,000 banners are produced by screen or digital printing, along with 30,000 national and international flags in a variety of sizes and colours. Half a million square metres of material are used to make a wide variety of flags and banners, many of which have been seen at Olympic Games and World Championships held in Europe.

An emergency led Fahnen-Gärtner having to make a fundamental decision. As the saying goes, the problem was blowing in the wind. Eight years ago, a wastewater system had been constructed, where 70% of the wastewater was used as process water. "During the night, when the plant was idle, an overpowering putrid smell was given off," remembers managing director, Gerald Heerdegen. Air quality in the plant significantly improved after installing the water revitalisation system in both the process water and washing areas. "The amount of bacteria has clearly been reduced and the smell has improved," confirms Heerdegen.

Experiments are underway in another area. 1,200 to 1,400 litres of oil are needed every day to produce steam. A device was also installed in the oil pipe.

"Since we started using the Grander system, we have been able to save on the use of heating oil and we are expecting the boiler to be more effective," says Heerdegen. He sees the Grander water revitalisation system as a way of protecting the environment. Heerdegen is convinced by this and ending by saying that "It is important to our company that we preserve both the environment and resources. Revitalised water helps us do this."

Graphic:
Anaerobic bacteria are responsible for unpleasant smells. During the observation period of May-November 2004, the bacteriological situation was seen to have greatly improved and emissions of odours were clearly reduced. The results were measured by a recognised scientific institute.

Information
Grander used since 2004

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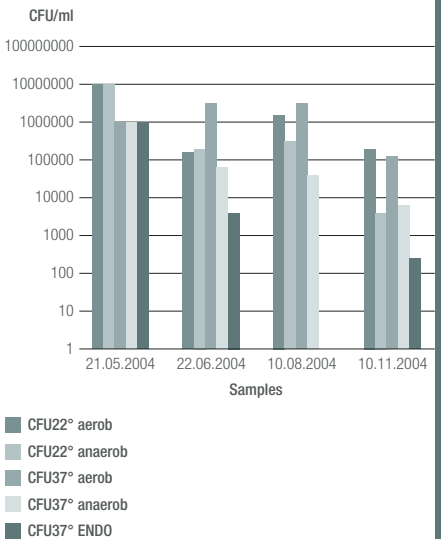
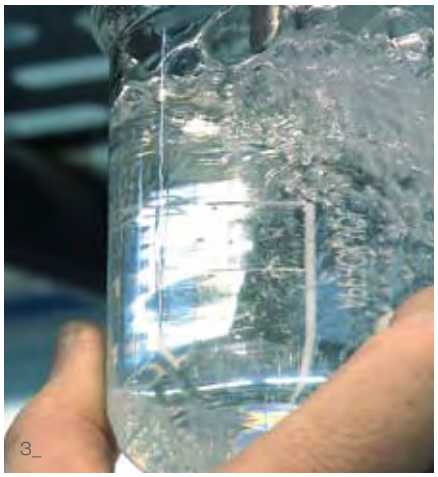
Kürsingerdamm 6
A-5730 Mittersill
E-Mail: office@fahnen-gaertner.com
www.fahnen-gaertner.com

Bacteriological status





1_ Formtec, from Kronau, use special processes to manufacture injection moulding tools

2_ Managing director, Andreas Czotscher: the use of chemicals in the process is banned

3_ Only clear water is used in the cooling system

clear cooling water

Formtec GmbH Kunststofftechnik have replaced chemicals with revitalised water in their cooling systems

Formtec, based in Kornau near Karlsruhe in Germany supplies tools and manufactures plastics. Qualified technicians and engineers turn components into complicated injection moulding equipment, using simulation software within 3D-CAD systems and the latest analytical technology. In addition to the quality of the products, the company also lays great store by environmentally-friendly processes that help save resources.

Two cooling systems are in use. These are needed to cool the injection moulding machines and the moulds. Here, the water remains stable and fulfils its function, with the cooling water having to be supplied and maintained at a constant temperature. Initially, normal water from the system of water pipes was used. The result was a build-up of sludge and algae and a higher proportion of bacteria, with various chemicals being used to stabilise the coolant water. "We tried chemical solutions and nothing really worked," reports Technical Director, Rüdiger Epp. "The Gander water revitalisation system was first used in the cooling system in 2005 and, since then, we have been able to stop the use of any type of chemicals," describes Andreas Czotscher, the company's managing director. After three quarters of the year, rust formation and iron content have been reduced to nil. Maintenance costs are minimised and savings of around 5,000 euros achieved. "Previously, the coolant water was laden and polluted with bacteria. By using the Grander revitalisation water system, water is now of drinking quality. A short while ago, I was able to draw off a glass and drink it," confirms Epp.

Information
Grander used since 2005

Formtec GmbH Kunststofftechnik
An der Oberen Lußhardt 7
D-76709 Kronau
E-Mail: info@formtec-kt.de
www.formtec-plastics.de

1_ Clean, clear water from the workshops' cooling system

2_ World-renowned toothbrushes made by Gerresheimer Wilden

Drinking water quality from the cooling system

In the workshops of Gerresheimer Wilden AG Schweiz in Schönau, the Grander water revitalisation system is being used to tackle corrosion

Gerresheimer Wilden, formerly Interbros, are specialists in the manufacture of innovative plastics systems. Plastic parts are manufactured for the pharmacological, diagnosis and technical medicine areas of the medical sector. Parts are also made for the automotive industry and plastics systems for the consumer healthcare sector. Amongst other things, the company produces world-renowned toothbrushes. It has its headquarters in Germany, but is represented worldwide and is continuously extending its capacity.

The quality assurance of its plastics products is one of the central manufacturing requirements. The company is constantly working to optimise its production processes, analyse faults and correct them systematically. This includes the corrosion to be found in the cooling systems of the injection moulding tools.

The Grander water revitalisation system was first tried in 2002, when experiments were carried out in the cooling system, which was used to cool the injection moulding machines and moulds. Prior to the Grander system, glycol was added to the cooling water to inhibit corrosion. "The sediment of rust was surely caused by the soft water that we use," conjectures the technician, Stefan Brender. A stable water quality is especially required for the injection moulding machine, where every degree is vital and where it contributes to a problem-free process. "One year after the grander water revitalisation system was introduced we had the cooling system quality checked by an independent institute. Look at that, we have drinking quality water flowing through our pipes," says the enthusiastic Brender.

Information

Grander used since 2002

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Aiterfeld 1
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Fax: +49 (0) 941 / 7058-201
E-Mail: info-wilden@gerresheimer.com
www.gerresheimer-wilden.com

1_ Machines running without any problems at Hirschmann

2_ Walter Hollenstein: Dealing with the accumulation of sludge in the cooling systems

Cool water

Hirschmann Automotive GmbH in Rankweil in the Vorarlberg is solving its technical problems by using revitalised water.

Hirschmann Automotive develops innovative solutions in the automotive connector sector. Its product palette comprises various models of mechatronic components, intelligent sensors and actuator elements (position sensors), connectors, contact systems and wiring harnesses for a wide variety of applications in the safety and high-performance areas of the automotive sector. Prestigious car makers cannot get enough of the connector technologies produced by Hirschmann.

The cooling system had been a problem for years, but a permanent solution has only been a possibility since 2005. The Grander water revitalisation system was used in an experiment to tackle the extreme quantities of sludge that build up in the cooling system and the injection moulding machines. Cooling machinery is a decisive factor in terms of production. "The temperature has to be kept constant. If it increases, the silt builds up and there is less water flowing through. This is when shutdowns and stoppages occur. In terms of mass production, this is a disaster," states Walter Hollenstein, the head of the Rankweil plant. If they went down the traditional route of using filters and chemicals, our technicians could not come to grips with the build-up of sludge in the cooling systems. When we started using the Grander system, we were able to clean out the residue of the sludge. "These problems have been solved for two years now and we no longer have any major maintenance costs – our machines are running perfectly," Hollenstein concludes.

Information

Grander used since 2005

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Fax: +43 (0) 5522 / 307-555
E-Mail: info@hirschmann-automotive.com
www.hirschmann-automotive.com

1_

Information

Grander used since 1998

ISOSPORT Eisenstadt
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A-7000 Eisenstadt
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E-Mail: office@isosport.com
www.isosport.com

2_

1_ Technicians Günter Jurassovits and Hans Steindl show off a set of skis and a tennis racket – Isosport's most well-known products

2_ Stable cooling water prevents quantity problems from occurring in production

Perfect ski conditions for world champions

Isosport technicians confirm the effect of the Grander revitalised water in their cooling system

Isosport is one of the world's leading manufacturers of ski and snowboard materials from plastics. The Constantia Industries AG company was founded in 1969 and is now seen as a leading supplier to the ski, snowboarding, plate, automotive, construction, sport and leisure industries. One of their specialities is the manufacture of strings for tennis rackets. High quality raw materials guarantee quality products.

The evolution of skis and snowboards matches current trends. In terms of firmness, the composition of the upper surface and colour, products are made-to-measure. On the recommendation of its managing director, who was an enthusiastic private user of Grander, the Grander water revitalisation system was incorporated into the company in 1998. It is particularly vital that the plastics machines, the so-called extrusion systems, are cooled. Here, plastic granulate is melted and forced through a nozzle, before being moulded into the appropriate shape on a calender, a system consisting of several heated and polished rollers, arranged one on top of the other, and finally cooled.

"If there is a fault in this cooling process or if the heat is not optimally distributed by these cooling rollers, faults appear and the plastic warps. This in turn means that these products are unusable for further processing," declares development technician, Günter Jurassovits. Before Grander was used, anti scaling agents and corrosion inhibitors had to be added to maintain the coolant water's equilibrium and to remove algae and rust. "After we installed the Grander water revitalisation system, we reduced our use of chemicals by 20% and, a year later, we were able to do without the chemicals altogether, since the cooling system was stabilised," announces Jurassovits. "In our experience, it is possible to have a chemical-free cooling water water stabilisation system," he concludes.

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The pioneering spirit and the desire to exper

Manner looks back on 15 years' experience of using Grander

Helmut Ondricek, a technician with Manner AG, is the father of the industrial use of the grander water revitalisation system. As far back as 1992, he was successfully experimenting in the Viennese operation (Napoli-Casali), where he introduced Grander systems into the cooling system for the first time. Before this date, they had not been used in any mass-production plant. 35 cooling machines were in service, supplied with water from two cooling towers. 400m3 of water circulated every hour over two 2" devices, which were installed in the bypass. Ondricek tried to come to terms with the algae and the slime bacteria in the cooling system, but these could only be controlled by using large quantities of chemicals. The results were overwhelming: "After only two weeks, we were able to discontinue the use of any chemicals. The system was amortised in nine months, because of the savings we made on chemicals," reports Ondricek. Not only were savings made in terms of chemicals, maintenance costs were also clearly reduced by up to 70% annually.

Ondricek's curiosity was aroused. "I was constantly monitoring my environment to see what I could improve." He also entrusted the cleaning of the plastic chocolate moulds to Grander. Since that time, the moulds have never become brittle, as rinsing agents and high temperatures can now be avoided during the washing process.

1_ A secret ingredient in Manner wafers: For a little while now, revitalised water has been used in the production of the wafers

2_ Helmut Ondricek is the father of the industrial use of Grander

3_ Special application of revitalised water in the cooling system

Information
Grander used since 1992

Josef Manner & Comp. AG
Wilhelminenstraße 6
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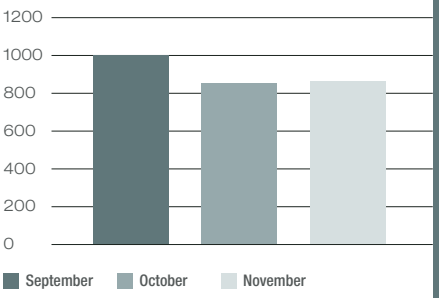
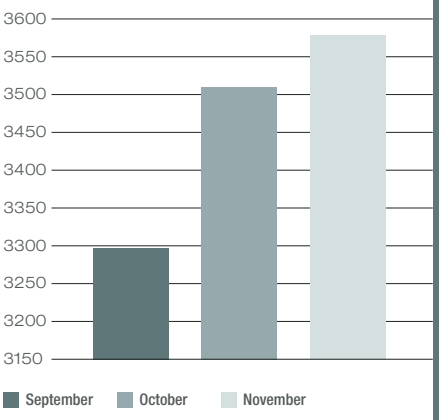
Fax: +43 (0) 1 / 486 21 55
E-Mail: j.manner@manner.com
www.manner.com

Broken wafers



Acceptable wafers



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Graphic:
Experiments using revitalised water were also carried out on wafers. Within three months of using the Grander water revitalisation system, a clear reduction in the amount of broken wafers and an increase in the quantity of good wafers could be documented.

When the technicians symposium was held in the famous Spanish Riding School of Vienna, Ondricek unveiled a secret: "Recently, we haven't used revitalised water just in our cooling system, we have also carried out successful experiments with regard to the production of the world-famous Manner-wafers," he enthused. The confectionery company produces up to 4,000 tons of slices every month and the amount of water in the dough is vital, since the less water there is, the crispier the wafers are.

Since the Grander water revitalisation system was used, the quantity of water and the amount of substandard wafers have been reduced and production increased. Ondricek summarises this as follows: "We have used the Grander water revitalisation system for the past 15 years and it is still working as well as it did on the first day. It is a really sensible idea and I can only recommend it to each and everybody."

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1_ Molten metal is decanted from an electric arc oven

2_ Site supervisor, Ludwig Jernej: convinced by the effectiveness of Grander

3_ Corroded heating pipe and calcified pipes belong in the past

Soft water

The successful use of Grander in Machinenfabrik Liezen and Gießerei GesmbH

Corroded heating pipes and lime-scale were the main problems facing the technicians at Machinenfabrik Liezen and Gießerei GesmbH. The company can count on over 50 years experience in the sectors of processing technology, machine assembly and casting.

In order to deal with the rust and limescale that build up in the cooling water system, the management turned to Grander. “Every two to three months, silt and dirt collected in the heating pipes, resulting in rust and, finally, in the pipe leaking,” declares site supervisor, Ludwig Jernej. Whenever any damage occurred, the technician had to introduce an emergency supply so that the system could be repaired. Although the Grander revitalisation water system was not intended to deal with the lime-scale problems, they gave it a go.

The system has been in use for eighteen months now, with the first successes being reported within two months. The revitalised water was connected directly to the main network and all the process water revitalised alongside the drinking and cooling water. Site supervisor Jernej was amazed at the results: “I cannot really explain what happened, but the number of pipe breakages has been significantly reduced since then, the shower heads aren’t clogged up with limescale any more and the water seems much softer and better to wash in.” Measurements taken confirm this result: The iron content of the water fell from 25.95 mg/l to 0.957 mg/l. The foreman, Hubert Kettner, confirms that “there is practically no more iron in the water.”

Graphic:
During the observation period February to November 2006, the iron content fell from 25.95 mg/l to 0.957 mg/l.

Information
Grander used since 2005

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A-8940 Liezen
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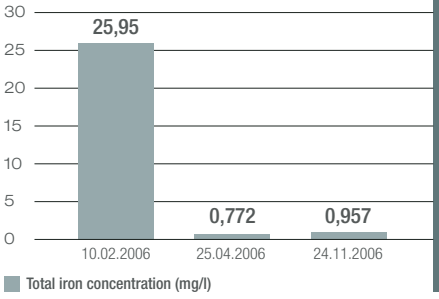
Fax: +43 (0) 3612 / 270-595
E-Mail: geschaeftsleitung@mfl.at
www.mfl.at

Iron content in water



1_ Vorarlberger Nachrichten: Bright colours and contrasting images

2_ The Austrian flagship company produces 55 print media

Information
Grander used since 2000

Vorarlberger Medienhaus
Gutenbergstraße 1
A-6858 Schwarzach
Tel.: +43 (0) 5572 / 501-0
Fax: +43 (0) 5572 / 501-227
www.medienhaus.at

Black on white

Revitalised water used for printing

55 different newspapers are printed by Medienhaus at Schwarzwach. The media company operates internet portals and regional radio broadcasts in Austria, Hungary and Rumania. In terms of its leading print medium, the Vorarlberger Nachrichten (VN), in particular, the company sees journalistic independence and detailed research as two of its main quality characteristics, in addition to the great care taken with layout and design and production and printing. The company's executive wants to bring worthwhile regional information and entertainment to its readers, listeners and internet users.

Products and production are constantly being improved and the media company has its nose in front in terms of technology. "Vorarlberger Medienhaus is the only printing house in Austria to meet the strict guidelines with regard to low-emission printing and to have been awarded the Austrian Environment Minister's Environmental Seal of Approval," boasts the company's homepage. In 2006, Vorarlberger Nachrichten was selected as the newspaper of the year, from over 18,000 newspapers worldwide. The jury were impressed by journalistic performance, print quality, design, content and profitability. "I am convinced that the Grander water revitalisation system has a part to play in this success," adds Wilfried Übelher, the company's technical director.

The Grander system was first used by the Vorarlberger Medienhaus in 2000, when a test run was started using the offset printing machines. "In offset printing, water quality, the ph value, conductivity and surface tension are very important. During the print process, these contribute to the excellent brilliance of the colours and the sharp, contrasting images," reports Übelher. Since the Grander water revitalisation system was introduced, the quality of the print products has markedly increased. The printing process is more stable and fewer corrections need to be made with regard to colour and flow conditions.

The technical director confirms that "the Grander water revitalisation system has brought major technical advantages to our operation."

1_

A revitalised brewing culture

The Memminger Brauerei increased the quality of its beer by using revitalised water

1_ Beer tastes rounder, smoother, more intensive and is easier to drink

2_ Master brewer and company representative Wolfgang Kesselschläger: a very good idea to use Grander

Hops, malt yeast and water and the ingredients of beers brewed according to the purity requirements. Since 90% of beer is water, this water is a decisive factor in the way beer tastes. Memminger Brauerei's basic idea was to revitalise the water using the Grander system, thereby improving the twenty speciality beers and alcohol-free drinks they produce. Since the spring of 2006, the Grander water revitalisation system has been in use to the company's complete satisfaction.

After using revitalised water, the award-winning master brewer and company representative Wolfgang Kesselschläger noticed changes in the way the products tasted. "The beer tastes rounder, smoother and more intensive." Brewing times have been reduced to just one day and, according to the expert, the carbonic acid has become like "fine pearls", making the beer easier to drink.

Grander is used in many ways in the privately-run brewery. "Everything to do with water is connected to the Grander water revitalisation system, i.e. the cleaning, heating, drinking water and beer production," confirms Kesselschläger. Savings can be made on energy costs by reducing the flow temperature of the heating devices and far fewer additives are used in the cooling system. Every year, 10% fewer acids and alkalis are used to clean the tanks, including a reduction of 2.5 tonnes in the amount of chlorine used every year in the alkaline tank cleaning process. "I believe the Grander water revitalisation system to be a very effective and efficient method and our company has been able to make significant savings in terms of energy and cleaning costs," confirms Kesselschläger.

2_

Information

Grander used since 2006

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Dr.-Karl-Lenz-Straße 68
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Fax: +49 (0) 8331 / 5010
E-Mail: info@memminger-brauerei.de
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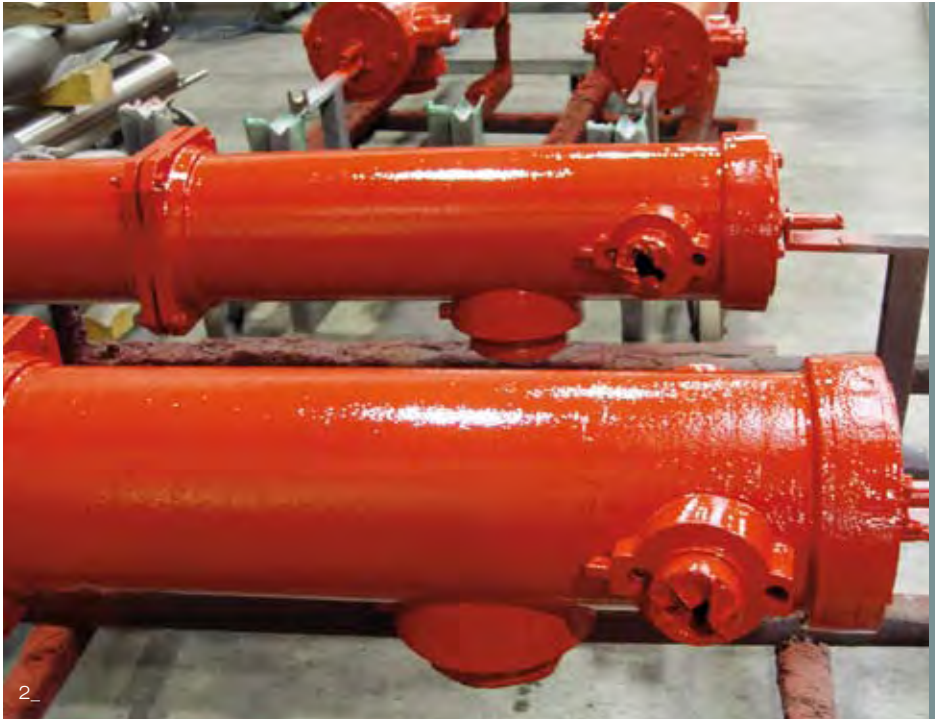
1_



2_

Information
Grander used since 2005

MKE – Metall- und Kunststoffwaren Erzeugungsges.m.b.H.
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A-3860 Heidenreichstein
Tel.: +43 (0) 2862 / 523 21-0
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E-Mail: office@mke.co.at
www.mke.co.at

Water for employees and machines

Excellent quality in terms of coolant lubricants recorded by the technicians of the metal and plastics product company in Heidenreichstein

The cult car known as the Bentley has enhanced the reputation of this Austrian company, which also makes special cigarette lighters for such luminaries as Cartier and Yves Saint Laurent, with collectors willing to offer the highest prices for these objects. The metal- und Kunststofferzeugung company (MKE) one of only three companies in Europe still manufacturing these special lighters. The company's main area of activity extends from small items made from metal and plastics to dental implants and heavy pressure reduction valves weighing up to 20 tonnes. Its products include hydrants, mountings, components and systems for railways, and the makers of film and medicine products.

In 2005, positive domestic experiences persuaded the company's executive to test the Grander water revitalisation system in their company. Initially, employees thought that they would be able to enjoy their drinking water from a Grander drinking water fountain. The "gift" was gratefully accepted by the workers. However, the mental leap was not that great. Could revitalised water also be used effectively in the production area? "In the summer, when it's very hot, the cooling water turned bad after three months, stank terribly and couldn't be used again," remembers the chairman of the council of employees, training officers and safety technicians, Christian Schleritzko.

The smell of the production water was unbearable and coming into contact with it could lead to skin irritation. Machines had to be cleared out in a relatively short space of time and refilled. The aim of this was to stabilise the coolant water in the system by using Grander water revitalisation system and to get rid of the smell caused by bacteria.

"In the beginning, we were still sceptical about the Grander water revitalisation system, but the smell got better and our skin was able to tolerate the coolant lubricant. We don't know how it happens, but Grander does work," says a very satisfied Christian Schleritzko.

1_ Christian Schleritzko: best quality in terms of coolant lubricants

2_ MKE: Red hydrants for the city of Vienna

2_ Water is certainly not one of the commodities in short supply in Bangkok, although there are problems in providing high quality water

3_ Slime formation in Aloe Vera pocessing is clearly reduced

4_ The swimming pool no longer has to be cleaned by divers

Every child in Bangkok knows the TIPCO Tower, the stately skyscraper on Rama 6 Road, but hardly anyone knows that from basement to penthouse, the water is provided by a revitalised water system, including the swimming pool that is open to the public. The brains behind the idea was the chairperson of the TIPCO Group, Anurat Tiamtan, who came across the Grander system on the internet and tested it out at home. She found that the water she had used throughout her life was changed.

Anurat Tiamtan then used her experiences as a basis for fitting out the company's headquarters. The use of chemical additives was reduced, together with the amount of cleaning and service work. The amount of chlorine added to the swimming pool was halved. The reduction in the smell was especially welcomed in both the swimming pool and the adjoining fitness centre. The manageress of the swimming pool, Suthikan Phothiphat was able to do without the divers, who regularly had to remove the algae from the pool walls.

TIPCO is one of the largest foodstuff groups in Asia and, in September 2007, joined forces with the Japanese Suntory Group. TIPCO has grown from its origins as a small pineapple factory in 1976 until the present day, when it is one of the largest suppliers of tropical fruits, teas and Aloe Vera etc. The plant, located 300km to the south of Bangkok, houses 6,000 workers. The familiar reactions that fol-

1_ Tipco Foods: preparing fruit, vegetables, green tea and Aloe Vera

...and in the big, wide world

Revitalised water cleans Aloe Vera plants, hot water boilers and the swimming pool in the TIPCO Tower in Thailand

5_ The chairperson of the TIPCO Group, Mrs Anurat Tiamtan uses Grander throughout the tower

low the use of the Grander water revitalisation system were also seen here. The hot water boiler does not attract limescale to the same extent and pipes are easier to clean. The water made the washing of Aloe Vera much easier by reducing the build-up of slime and also many other small positive reactions were observed during operations.

In all respects, including the technical, Anurat Tiamtan confesses to be particularly impressed, especially after observing a very specific aspect: "Since the fountains in front of the company's headquarters also use revitalised water, the area's homeless dogs have become permanent visitors, coming to drink the water," she says with satisfaction. "I came across a dishevelled dog and found that his sores had healed and that his fur was as soft as silk!"

Information

Grander used since 2005

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E-Mail: food@tipco.net
www.tipco.net

Grander Journal IV

This journal contains valuable information on the topic of water and a representative cross-section of current applications of the Grander water revitalisation system

You can obtain the above, along with more information on the Grander water revitalisation at www.grander.com or by contacting Uranus Verlag on +43 (0) 4 / 403 91 11 or verlag@uranus.at, free of charge.

Grander DVDs

Clear water for industry

This DVD gives you more information about the industrial applications contained in this brochure. The relevant technicians discuss their individual experiences of using the Grander water revitalisation system in their operations .

Dual language DVD: German and English

Grander – experiences

This DVD documents current and traditional examples of users. Specific emphasis is placed on the benefits of using the Grander water revitalisation system in baking and in processing cereals.

5-language DVD
German, English, French, Italian and Spanish

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GRANDER
WATER REVITALIZATION

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HEATING SYSTEM PROTECTION

Export EN

GRANDER®
WATER

www.grander.com

... the universal **power** of **water**.

GRANDER® IMPROVES HEATING

With GRANDER® the water in the heating system is better protected against corrosion – This benefits the environment and creates a cosy atmosphere in the living rooms.

Water is the source of life.

Water in its original form is the bubbling source of vitality and life force. However, when it is pumped at high pressure in closed pipes over long distances, it loses its power and life.

GRANDER® water revitalization restores water to its original structure and energy – with all its multiple positive effects on drinking and process water. Water encounters very difficult and unnatural conditions in heating circuits with rust formation being a major problem in the heating system. Oxygen-rich heating water often has a corrosive effect on heating pipes, boilers and fittings. The consequences of which are pitting corrosion, leakage and the formation of deposits. The heating water itself becomes brown or black and foul smelling.

Lime-scale deposits impair heat transfer. **A single millimetre of lime scale on the heat exchanger increases the energy consumption by approximately 6%.**

Out-gassing due to temperature increases, bio-film formation and oxygen intake are responsible for disturbing noises in the heating pipes. Fittings are waterproof, but not gas-tight.

Bio-film and sludge formations consist of a thin layer of slime in which bacteria, fungi, algae and dirt are embedded. Especially in underfloor heating systems where they lead to an overgrowth within the heating pipes and reduction in efficiency.

District Heating System
Using 6 x Grander K 40 DN:100

GRANDER® BRINGS A BETTER QUALITY OF LIFE TO YOUR HOME THROUGH HEATING

The quality of our water influences both our equipment and the feeling of warmth.

The "chemical malaise"

By adding chemicals and various processing methods, an attempt is made to reduce technical difficulties. This has the unfortunate result of taking the last "spark" of vitality from the water. Generally poor water quality in heating systems not only has a negative influence on the equipment itself, but also on the living climate in the rooms heated. The warmth tends to be perceived as dull and uncomfortable.

GRANDER® works "naturally"

GRANDER® water revitalization restores the load-bearing capacity, vitality and self-cleaning power to the heating water. This results in the contaminated and usually foulsmelling heating water becoming clear and largely odourless again within a few months due to its regained self-purification power. This is associated with an economic benefit and noticeable positive changes in the personal living area.

GRANDER® effect: is clearly visible as in heating water

> GRANDER® devices work without electricity and without chemicals

> Clean and odourless heating water

> Decrease in the tendency to silt up through a significant reduction of bio-film formation

> Reduction of microbial susceptibility

> Reduction or stabilisation of corrosiveness

> Reduction of the sedimentation tendency

> Heating pipes, radiators, floor and wall heating are again free and continuous

> Reduction of out-gassing as a result of reduced gas formation

GRANDER® pays off from the first hour

> Energy saving

> Increased operational safety

> Optimization of the operating parameters

> Improvement in the degree of efficiency

> Increased protection of the boilers with regard to technical problems

> Optimisation of the current operating and maintenance costs

Increased well-being through natural warmth

> The renewed vitality of the heating water ensures a naturally pleasant and cosy room climate.

GRANDER® MAKES YOUR HOME REALLY COMFORTABLE

Increased well-being through a natural and comfortable indoor climate.

Revitalizing the heating water has a very positive effect on the indoor climate. The room climate is perceived as very pleasant and the warmth as comfortable. Customers say they feel totally wrapped up by the revitalising warmth and feel a natural soft luxury living in a home where the heating water is full of life and energy.

Just like air is present in water, water is in the air, which is heated and revitalised by radiators or under floor heating.

Cost saving by lowering the room temperature

Long-term users of GRANDER® heating revitalization report that the heating temperature can also be lowered by several degrees due to the more intensive heat sensation and it's lingering capacity. This has enabled energy savings. Because: 1°C temperature reduction means about 6% energy savings.

The heating system usually accounts for about 80% of the energy costs in a home. Therefore, it makes sense to include all possible savings steps, such as installing GRANDER® water revitalisation in the heating system.

INSTALLATION AND DIMENSION GUIDELINES

Heating systems are closed water circuits, where, depending on the degree of utilization, the entire water volume circulates through the system several times a day.

As a rule, GRANDER® heating systems should be installed in the return flow (T<95°C).

Dimensioning depends on the individual structural conditions and is determined by the GRANDER® expert consultant during a personal visit.

Note :

Even when using GRANDER® water revitalization, the basic technical rules of the heating system must be observed: Possible additional technical measures may be necessary in individual cases. GRANDER® is also successfully used in large-scale projects, where the savings often pay for the investment in as little as 1–3 years.

On-site consultation

To optimise your heating system, you are welcome to receive a non-binding and free on-site consultation with a welltrained and competent GRANDER® expert advisor.

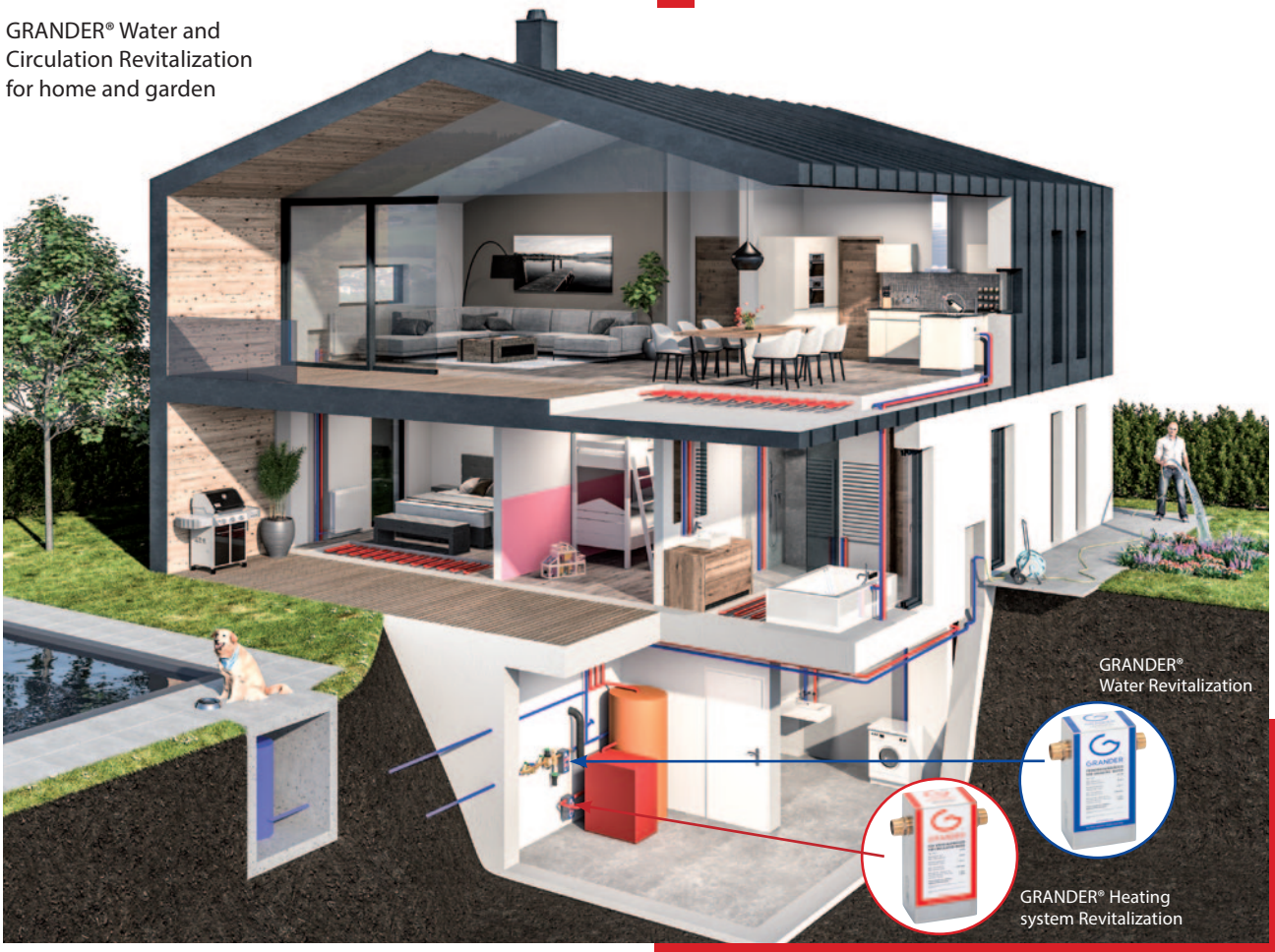
For complex technical problems, a chargeable analysis of the heating water can be carried out by an official research laboratory.

Technical safety and reliability of the heating system

Increased well-being through revitalized heat

Cost reduction through energy saving

GRANDER® Water and Circulation Revitalization for home and garden



Garmisch-Partenkirchen/DE

HEATING IN THE WIGGER RESIDENTIAL COMPLEX

The heating circuit has been revitalized by GRANDER® since 2007

Already in 2001, GRANDER® Inline Units were installed to revitalize the drinking water in all five buildings of the Wigger residential complex in the German town of Garmisch-Partenkirchen. As the inhabitants' feedback was so positive, a further unit was installed to also revitalize the complex's heating system in 2007.

When so many people living in the residential complex reported back about the outstanding quality of their drinking water ever since the installation of GRANDER®, in 2007 a decision was made to invest in a four-inch GRANDER® Circulation Unit to revitalize the heating circuits of the complex's five buildings with overall 158 apartments.

In the following years, water samples were taken and analyzed several times to check and document the heating water's quality. The analyses found that throughout the observation period, the iron concentration continuously decreased, which has had a positive impact on corrosion protection. An analysis in 2009 furthermore revealed that the heating system's microbial count was zero. This also means that there were zero E. coli or coliform bacteria in the heating circuit.

Years after its installation, property manager Christian Wackerle is still full of praise for the circulation unit when asked about its effects in spring of 2021: 'Getting a GRANDER® Circulation Unit for our heating circuit has really paid off. As the system is now less susceptible to deposit formation, there is less rust and lime, which damage the facilities in the long run. As a result, the heating circuit operates effectively and reliably, saving the apartment owners quite a bit of money and ensuring their peace of mind.'

This is also the case because several radiators were exchanged for new models in the past years. During the replacement, it was found that the heating water remaining in the radiators was clear and free of any contamination. Also some heating pipes were exchanged because of refurbishment work, and none of them showed signs of rust. In fact, there has not been a single report of damage to the heating system due to corrosion throughout the whole residential complex so far.
The revitalized heating water has also markedly improved the atmosphere in the apartments. The inhabitants of the Wigger residential building say that the atmosphere is very comfortable and the warmth provided 'extremely cozy.'

Oberpullendorf/AT

INDOOR CLIMATE IN THE KINDERGARTEN IMPROVED

Thanks GRANDER® drinking water quality in the heating

The parish kindergarten in Oberpullendorf, having relied on GRANDER® water revitalization for many years now, reports: thanks to GRANDER®, the heating water has been crystal clear and has met drinking water quality requirements since 2004!

The conditions in heating systems put a strain on the water used in them, and this is particularly true for floor heating systems. Slimy deposits often accumulate in the loops installed in the floor or the walls. What is more, the water is rarely heated above 40 °C in such systems. These are perfect conditions for bacteria to thrive: heating water turns murky and foul-smelling and accumulations reduce the throughput of the pipes. As a result, heat emission is reduced and in extreme cases the whole heating system can break down.

To protect the facilities, save energy, and improve the room climate, the heating system of the Oberpullendorf kinder–garten was fitted with a GRANDER® unit in 2004.

An analysis of the heating water more than fifteen years after the installation revealed that the heating water is still crystal clear and has drinking water quality! Ever since the installation of a GRANDER® Circulation Unit in the kindergarten's heating system, the heating water has been closely monitored. The various analyses conducted show that **all chemical and chemical-physical parameters checked not only satisfy the requirements of the ÖNORM H 5195–1 standard of the Austrian Standards Institute, they also meet the quality standards set by the Austrian Drinking Water Regulation.**

The GRANDER® Inline Unit restores the transport capacity, vitality, and self-cleaning properties to the heating water. Having regained its natural power to self-clean, the dirty and often foul-smelling heating water turns clear and mostly odorless in a matter of only a few months. This not only results in cost savings but also prompts a palpable and positive change in the heated rooms.

There are few areas where the GRANDER® effect shows as clearly as in heating water. The samples taken from the Oberpullendorf kindergarten's heating system prove that GRANDER® starts paying off from the moment it is installed:

> Makes for clean and oderless heating water
> Lowers risk of silt deposits as biofilm formation is considerably reduced
> Reduces susceptibility to microbial contamination and corrosion
> Lowers susceptibility to deposit formation: improves throughput of heating pipes and radiators as well as the piping of floor and wall heating systems
> Saves energy
> Increases heating efficiency
> Creates a pleasant room climate
> Optimizes operating and maintenance costs

Adobe Stock: © Krakenimages.com

Münchwilen/CH

VITALIZED SUCCESS STORY OF THE WOOD CHIP HEATING

GRANDER® clarified polluted and silted circulating water

GRANDER® made contributions to the following two projects: the 'Murgtal wood chip heating plant' project was kicked off in 2011, but after only a few months of operation, contaminations in the plate heat exchanger started causing problems. Chemical, physical, and microbial analyses showed that the contaminations were caused by microbial factors.

Based on the vast experience gained in many years of advising customers on biological problems of industrial and heating system applications, we recommended the installation of a GRANDER® Circulation Unit in the heating plant, which would be able to solve the issues without water exchange.

Laboratory analyses proved the effectiveness of this approach: GRANDER® water revitalization cleaned and stabilized the heating plant's water in a visible and measurable way.

As a result, a GRANDER® Circulation Unit was installed from the very beginning in a new communal heating system that was set up and put into operation in September 2014. Once completed, this second project will be considerably larger than the' Murgtal' project. In addition to single-family and apartment buildings, it also supplies energy to the industrial company Diversey AG, which operates commercial facilities and a restaurant on its premises. When this heating system was put into operation using demineralized water, it took only 14 days until a considerable amount of foul-smelling silt deposits had formed. The industrial heating grid had been connected without rinsing or exchanging the water and due to the high solubilizing capacity of GRANDER® water revitalization, the silt deposits in the piping system had started to come off.

As GRANDER® water revitalization triggers the circulation water's organic purification properties, no further measures were necessary besides the use of a pH buffer solution to gradually clarify the smelly and silty water. The project support team regularly takes samples and confirms that the circulation system's water was fully and sustainably cleaned.

GRANDER® Circulation Units stabilize circulation water in a sustainable way, as a result of which no buffers or inhibitors are needed. For operators, this means increased efficiency and also a vital contribution to environmental protection.

Alta Badia/IT

A COZY AND WARM HOME FOR THE FISTILLS

Clear water has a positive effect on the utility bill

The Fistills first heard about GRANDER® water revitalization from a friend, who highly recommended it. In 2017, the South Tyrolean family decided to get GRANDER® for their home in La Villa/Alta Badia in the Badia Valley.

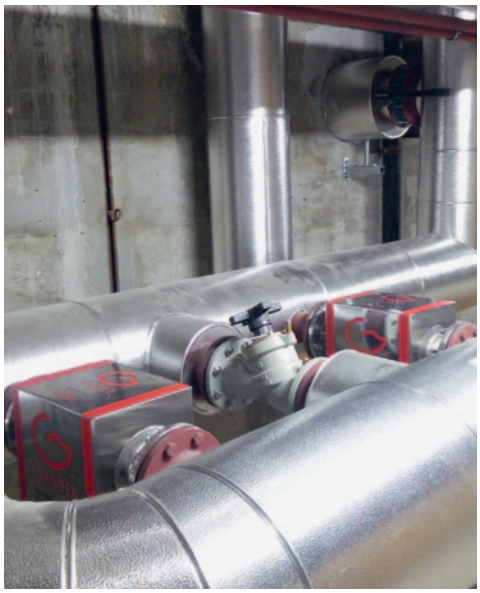
In the small village of La Villa, numerous family and hamlet names somehow refer to water. One example is the Funtanacia hamlet, whose name is related to the Ladin word for 'fountain.' By a twist of fate, this is the very hamlet that is home to the Fistill family. Also the Fistills' name has a connection to water as 'fistí' means 'well.'

It is important to the Fistills to have fresh, high-quality water in their home. But as opposed to their ancestors, who relied on their own well, their water comes from the tap.

Following a family friend's recommendation, the Fistills brought GRANDER® to their home to revitalize both their drinking and heating water — and they are exhilarated about the effects, reporting about tap water with an exquisite taste and also pronounced effects in their heating system!

For many years, their home's old pipes had clogged up time and again. As a result, the house was not heated efficiently. Biofilm and silt are formed by slimy deposits containing bacteria, fungi, algae, and other contaminants. Such deposits are particularly a problem in floor heating systems, where they impair the heating effect. This also results in higher costs.

GRANDER® restores the transport capacity, vitality, and self-cleaning properties to heating water. Also in the Fistills' home, lime deposits dissolved due to the revitalization of the heating water. Now, the house can be heated more effectively and efficiently.
The heating water also turned clear and even lost its foul smell. The revitalized heating system has thus lowered operation costs and markedly improved the atmosphere in all rooms.



Water Storage Settling / Buffer Tanks - Swimming pools & ponds

The GRANDER® - K Sereries

Art. no.	WDZK	WDZG	WEZK
Temperature range [°C]	1-90	1-90	1-90
Approx. dimensions [mm]			
Height	150	285	165
Width	120	180	
Depth	55	70	ø 34
Approx. weight [kg]	2	5,5	0,5

For Hose and Shower

Art. no.	WFL38
Nominal diameters under DIN EN ISO 6708	DN15 or DN20
Max. water pressure [bar] to	7
Temperature range [°C]	1-60
Max. pressure loss [mbar] [1]	[2]
Flow [l/s] [1]	[2]
Approx. weight [kg]	1
Approx. dimensions [mm]	
Height	120
Width	60
Depth	40

[1] With a flow rate of v = 2 m/s
[2] not measured

Heating and cooling circulation systems

Art. no.	K50	K75	K10	K54	K64	K20	K25	K30	K40
Nominal diameters under DIN EN ISO 6708	DN15	DN20	DN25	DN32	DN40	DN50	DN65	DN80	DN100
Max. water pressure [bar]	10	10	10	10	10	10	10	10	10
Temperature range [°C]	1-95	1-95	1-95	1-95	1-95	1-95	1-95	1-95	1-95
Max. pressure loss [mbar] [1]	9	10	9	14	14	11	11	12	11
Flow at [l/s] [1]	0,14	0,25	0,39	0,64	1,00	1,57	2,65	4,02	6,28
Max. pressure loss [mbar] [2]	50	60	50	70	90	100	100	100	90
Flow at [l/s] [2]	0,35	0,63	0,98	1,60	2,50	3,92	6,63	10,04	15,69
Approx. weight [kg]	1,5	4,5	7	10	12	20	30	50	119
Approx. dimensions [mm]								with/without flange	
Height	130	215	260	295	340	445	530	610	910
Width	65	95	125	160	160	180	220	360/220	530/340
Depth	55	95	100	110	120	130	160	200/180	260/260

[1] Heating Circuit: flow rate 0,8 m/s
[2] Trade and Industry: flow rate 2 m/s
K300/K30, K400/K40 with flange – DIN 2633

WATER STABILITY IN UK HEAT NETWORKS: EVIDENCE AND TRIALS

White Paper

Authors
Jeremy Jones
Adeniyi Okinikan

January 2026

GRANDER®
WATER

Water Stability in UK Heat Networks: Evidence and Trials

White Paper

Authors
Jeremy Jones
Adeniyi Okinikan

January 2026

Executive Summary

District heating and communal heating systems in the UK consistently experience operational issues that are not driven by poor mechanical design, but by the progressive degradation of circulating water quality over time. These issues commonly manifest as plate heat exchanger fouling, blocked strainers, differential pressure (ΔP) alarms, corrosion by-products such as magnetite, increased call-outs, rising operational expenditure, and shortened asset life.

Current industry practice typically addresses these symptoms through front-loaded interventions such as chemical dosing, inhibitor regimes, or demineralised system fills, combined with periodic drain-down and corrective maintenance. While these approaches are well established, they do not provide continuous support for long-term water stability and, in practice, often fail to prevent biological instability, sludge formation, and repeated intervention.

This white paper introduces the GRANDER® K Unit, a non-chemical, passive system water stabilisation technology designed specifically for closed-loop heating and district energy systems. Unlike one-off water treatments, the K Unit operates continuously, supporting stable system water behaviour on every circulation cycle without chemicals, consumables, power, or control integration.

In UK heat networks, degraded water quality is a leading contributor to HIU plate heat exchanger fouling, blocked filters and strainers, ΔP faults, accelerated pump and valve wear, increased system top-ups, and recurrent maintenance call-outs. These challenges align directly with the risks identified in CIBSE CP1 and the water-quality management objectives outlined in BSRIA BG50, which emphasise long-term system stability, reduced intervention, and whole-life performance.

Independent long-term installations demonstrate that systems incorporating the GRANDER® K Unit can exhibit sustained reduction in sludge and corrosion by-products, improved stability of circulating water, reduced fouling of heat exchangers and control components, and lower call-out frequency. These outcomes translate into reduced operational risk, lower operational expenditure, improved asset protection, and alignment with sustainability and chemical-reduction objectives.

For UK asset owners and operators, the most appropriate route to adoption is a controlled, monitored trial installation, allowing performance to be evaluated against clearly defined baseline conditions and operational key performance indicators using existing monitoring and sampling regimes. This approach aligns with CP1 principles of evidence-based decision-making and enables validation under real UK operating conditions without introducing additional monitoring burdens.

Contents

1. Operational Challenges in Closed-Loop Heating Systems

Closed-loop heating systems are inherently sensitive to water-quality degradation over time. Common contributors include corrosion by-products, microbiological activity, organic debris, oxygen ingress, and repeated thermal and pressure cycling.

These mechanisms can result in:

- Sludge and magnetite accumulation

- Biofilm formation
- Flow restriction and ΔP instability
- Reduced heat-transfer efficiency
- Accelerated wear of pumps, valves, and HIUs

While chemical treatment and demineralisation can provide short-term control, they do not continuously support the stability of the circulating water. As a result, degradation mechanisms often reassert themselves, driving repeat interventions and increasing operational burden.

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2. The GRANDER® K Unit – System Water Stabilisation Approach

The GRANDER® K Unit is a passive, inline system water stabilisation device designed for closed-loop heating and district energy applications.

Key characteristics:

- No chemicals or additives
- No mineral removal
- No electrical power or controls
- No consumables or maintenance cycles

The K Unit operates continuously, supporting the long-term stability of the circulating water throughout the life of the system. It is intended to complement, not replace, good design, commissioning, water-quality governance, and monitoring practices.

For clarity, the GRANDER® K Unit does not adjust water chemistry, dosing, or inhibitor levels. It operates as a passive system support intended to promote long-term stability of circulating water.

From an engineering perspective, the K Unit introduces:

- No meaningful hydraulic penalty
- No compatibility risk with metals or elastomers
- No change to commissioning or control philosophy

The materials used in the construction of the GRANDER® K Unit are compliant with UK Water Regulations Advisory Scheme (WRAS) requirements for materials in contact with water.

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3. Evidence and Performance in Closed-Loop Heat Networks (UK Context)

This section presents measured and observable performance outcomes from long-term installations and laboratory analyses, framed using operational metrics relevant to UK district and communal heating systems and aligned with CIBSE CP1 and BSRIA BG50 expectations.

3.1 What Is Measured in UK Heat Networks

In UK district and communal heating systems, water-quality performance is typically assessed using a combination of direct measurements and operational indicators, including:

- Magnetite and iron concentration

- Differential pressure (ΔP) stability across HIUs and plate heat exchangers
- Plate heat exchanger fouling rates
- Filter and strainer cleaning frequency
- Water-quality-related call-outs
- System top-up frequency and volume
- Chemical dosing and corrective intervention frequency

These metrics align directly with CP1 requirements for ongoing performance monitoring and BG50 guidance on corrosion, fouling, and biological risk management.

3.2 Summary of Observed Performance Outcomes

Across long-running residential, communal, and district heating installations, systems incorporating the GRANDER® K Unit have demonstrated the following repeatable operational trends:

- Sustained reduction in corrosion by-products
- Improved long-term stability of circulating water
- Reduced fouling of plate heat exchangers and control components
- Lower frequency of reactive maintenance and call-outs
- Reduced reliance on chemical dosing and drain-downs

These outcomes have been observed over multi-year operating periods, not short-term trials.

3.3 Indicative Performance Metrics (UK-Relevant Mapping)

Table 1. Indicative Performance Trends Observed in K-Unit-Supported Systems

Parameter	Typical Baseline Condition	Observed Trend Over Time
Magnetite / Iron	Elevated or rising	Progressive reduction or stabilisation
ΔP across HIUs	Rising or unstable	Flattening and long-term stability
Plate heat exchanger fouling	Periodic intervention required	Reduced fouling frequency
Strainer cleaning	Frequent or reactive	Extended cleaning intervals
Call-outs	Recurrent water-quality-related	Reduced volume and recurrence
Drain-downs	Periodic corrective	Avoided or significantly reduced

Exact values vary by system size, materials, and operating regime. Trends are consistent across installations.

3.4 Long-Term European Case Studies (Durability and Repeatability)

Long-running installations across Switzerland, Austria, Germany, and Italy provide durability evidence for the technology under real operating conditions.

Observed outcomes include:

- Dissolved iron reduction from 755 micrograms per litre to 41 micrograms per litre within ten months
- Stable pH maintained within corrosion-resistant ranges

- Long-term clarity of circulating water
- Reduced requirement for inhibitors or corrective intervention

These installations demonstrate repeatability and longevity, not direct equivalence with UK schemes.

3.5 Comparison with Demineralised Water (Operational Lens)

Table 2. Operational Comparison

Aspect	Demineralised Water	GRANDER® K Unit
Intervention type	One-off fill	Continuous system water stabilisation
Drain-downs	Required	Avoided
Biological stability	Degrades over time	Maintained
Ongoing management	Monitoring and correction	Passive
Alignment with CP1	Partial	Strong
Long-term protection	Limited	Continuous

3.6 UK Laboratory Verification

A domestic closed-loop heating system incorporating a GRANDER® K Unit was analysed by a UKAS-accredited laboratory.

Results demonstrated stable pH, very low dissolved metals, low conductivity, no detectable sulphate- or nitrate-reducing bacteria, and very low total viable bacterial counts. The system water complied with BSRIA BG29 guidance.

While domestic in scale, this confirms compatibility with UK testing methodologies and standards.

3.7 Limitations and UK Applicability

Most long-term operational data originates from European installations operating under local standards. While degradation mechanisms are comparable, performance outcomes must be validated under UK operating conditions.

Accordingly, the evidence supports:

- Low operational risk
- Repeatable system behaviour
- Justification for controlled UK trials

It does not replace UK-specific evaluation.

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4. UK Trial Framework for District and Communal Heating Networks

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To provide a controlled, auditable pathway for UK stakeholders to evaluate performance under real operating conditions without compromising compliance, warranties, or governance.

4.2 Trial Scope and System Selection

Trials should target defined zones or buildings with known issues such as fouling, ΔP instability, elevated magnetite, or high call-out frequency.

4.3 Baseline Assessment

Baseline data shall be drawn from the operator's existing monitoring and sampling regime.

Where systems are already sampled weekly, monthly, or quarterly, these established cycles shall be used to define baseline conditions and ongoing trends.

Typical baseline data may include:

- Magnetite and iron measurements
- ΔP records
- Strainer cleaning history
- Call-out logs
- System top-up volumes
- Chemical dosing records

No additional sampling regime is required.

4.4 Installation and Operation

- Inline installation
- No drain-down required
- No chemical or control changes
- Fully reversible

4.5 Trial Duration

Minimum duration: six months
Preferred duration: nine to twelve months

Where existing sampling cycles already provide clear trend data, early performance indications may be assessed without waiting for the full trial duration.

4.6 Monitoring KPIs

Performance monitoring shall use existing routine inspection and sampling cycles, assessing trends in:

- Magnetite and iron
- ΔP stability
- Fouling frequency
- Call-outs
- System top-ups

4.7 Success and Evaluation Criteria

Success is assessed on trend-based improvement, including:

- Stabilised or reduced corrosion indicators
- Reduced maintenance intervention
- Improved ΔP stability
- No adverse effects

The absence of negative impacts is itself a critical evaluation outcome.

4.8 Governance and Compliance

The trial aligns with CIBSE CP1 and BSRIA BG50.
The GRANDER® K Unit complements existing water-quality governance and does not replace monitoring responsibilities.

4.9 Post-Trial Decision Path

At trial completion, or earlier where trends are conclusive, outcomes are reviewed jointly by the asset owner, operator, and consultant to determine expansion, extension, or removal.

Appendix A. CP1 and BG50 Alignment

The GRANDER® K Unit supports CP1 principles of whole-life performance, operational resilience, and evidence-based monitoring. It aligns with BG50 objectives for corrosion control, fouling prevention, biological stability, and material compatibility.

The technology introduces no chemicals, no compatibility risk, and no governance conflict. Trial deployment is reversible and introduces no legacy risk.

Next Steps for Asset Owners and Operators

For asset owners, operators, and consultants overseeing district and communal heating systems, the evidence supports a clear, low-risk next step: conducting a controlled, reversible trial installation of the GRANDER® K Unit where persistent water-quality issues exist—such as repeated fouling, differential pressure (ΔP) instability, elevated magnetite levels, or high reactive maintenance.

Key trial advantages include: No changes to existing water-treatment governance No additional monitoring burden No commitment beyond the agreed trial period Performance evaluation can be conducted using established CP1- and BG50-aligned metrics, enabling data-driven decisions on broader system deployment. Organisations interested in a structured UK trial programme are encouraged to engage in an initial technical discussion to determine trial suitability, scope, and monitoring alignment.

Proven Performance Highlights

The GRANDER® K Unit has demonstrated long-term stability, water quality improvement, and significant chemical reductions across multiple applications relevant to district heating systems:

- **Murgtal Biomass Plant (DE/CH):** Eliminated severe microbial contamination and biofilms during commissioning; corrosion protection achieved without chemical additives.
- **Wigger Residential Complex (DE):** Over 14 years, iron and microbial counts dropped to zero; corrosion-free operation confirmed with notable cost savings.
- **Parish Kindergarten (AT):** Maintained clean pipes and water quality exceeding Austrian drinking water standards for 15 years; improved heating efficiency documented.

Industrial Validation:

- **Daimler Truck Plant (DE):** Stabilized cooling circuits with near-zero chemical use, improving uptime.
- **Austria Tabak (JTI Group):** Reduced HVAC chemical consumption by 40% annually.
- **Formtec Plastics:** Fully eliminated chemical use, saving €5,000 per year.
- **Memminger Brewery**: Cut chlorine use by 2.5 tonnes annually, enhancing energy efficiency.

Conclusion

Water quality remains one of the most persistent risk factors in district and communal heating systems. Technologies that provide continuous, non-chemical support of system water stability offer a credible opportunity to reduce long-term operational risk and maintenance burden.

The GRANDER® K Unit provides a low-risk, passive intervention that can be evaluated through structured UK trials using recognised CP1 and BG50 metrics and existing monitoring cycles. For asset owners and operators seeking improved reliability, reduced intervention, and long-term asset protection, it offers a pragmatic and defensible pathway forward.

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