

Solution to Scale Problems for Tims Dairy

Tims Dairy at Chalfont St Peter, Buckinghamshire is a producer of own label and contract packed cultured milk products such as yoghurt and crème fraiche. The factory is situated in an area of extremely hard water and the company was having problems with limescale build-up and milk scale build-up on the plate pack (heat exchanger). They recently installed a number of Hydroflow physical water conditioning units, in three locations, to control limescale from the water feeds and one before the heat exchanger on a milk line.



The result has been savings in chemicals, time and lost production associated with cleaning of the system. Prior to the installation of the C45 Hydroflow unit on the milk line, operators had to shut down the line twice a week and clean it with phosphoric acid. Now, cleaning is only required once a week and then half the amount of acid is needed.



The patented Hydroflow system is a physical water treatment system that prevents the build up of all limescale deposits, including calcium carbonate. Hydroflow works by emitting randomly-varying electric fields throughout the system. This enhances the precipitation of the bicarbonates, from solution to suspension, by introducing clusters of ions in the water to act as seed for suspended crystallisation. The resulting suspension, therefore, does not adhere to pipework or internal surfaces, but is merely 'washed away' with the flow.



No other physical water treatment system operates in the same way as Hydroflow; it offers specific advantages such as treating the water both upstream and downstream of the unit. Uniquely, it also protects standing water and is not dependent on water flowing past the unit. There have been a number of installations in which Hydroflow has solved scale problems for companies where other physical water treatment systems have failed.



Limescale build-up, in pipework, boilers and heat exchangers, is a common problem for business and industry. There has historically been only one way of addressing the problem - chemical water softening.

The problems with this method have been numerous and include corrosion and the cost of adding salt to the softening reservoir and the resulting effluent having higher concentrations of sodium. Another problem has been that softening does not remove existing calcium carbonate build-up or completely stop calcium carbonate build-up. This has to be removed by acid or scraping - a further cost in terms of material, operator time and generator down time.



If the water supply to boilers is not conditioned, scale build-up increases fuel consumption and the boiler deteriorates rapidly through the external overheating of the plates and tubes. If water is softened (ie treated chemically) sodium carbonate hydrolyses to produce free alkali that is aggressive to boilerplates and tubes.

Hydroflow is easily fitted to existing and new systems and the low operating costs will deliver payback in a very short period of time. There are benefits for the environment too - lower fuel requirements and a reduction in sodium that finds its way back to the watercourse.



Commenting on the installation Peter Timotheou, Director of Tims Dairy said, ***"Hydroflow has proved effective protection against our biggest production headache. I was so impressed with it, that I've had the domestic version fitted to my water system at home."***

This is the product featured in this case study



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Limescale protection first at Robinsons

Robinsons have their production facilities located at Norwich, which is an area of particularly hard water – a notorious production problem for drink and food manufacturers.



The factory has installed the Hydroflow water conditioning system to prevent the build up of limescale on the heat exchangers of the pasteurising system for the Fruit Spring line. This is the first installation that the manufacturers, Hydropath Holdings Ltd., believe has been used to protect a water and product system.



Prior to the installation of the Hydroflow units, the Robinsons production team had to stop production lines and descale the heat exchange plates every two to three weeks. This involved stripping down equipment and physically scraping off the limescale build

up with chemicals. This would take a full day and then involve a CIP (clean-in-place) and therefore amounted to a considerable production expense.

It was also not possible for the maintenance teams to always schedule this 'service' at a convenient time - such

as weekends; occasionally the build-up would be so severe that the descale would have to be carried out mid-week, and a day's production would be lost. In an attempt to solve the production headache, Robinsons' Process Manager consulted Dr Fred Walker, (Water Treatment Consultant) from Everett & Walker. He recommended the Hydroflow physical water treatment system.



Because of the consistency of the problem prior to installation of the Hydroflow unit, the team at Robinsons knew within a few weeks that it was having the desired effect. All that is now required is a routine inspection and clean every two months, without the need for an extensive descale. Any residue that has built up is of a white powdery consistency and easily brushed off. An added benefit for the consumers is that the calcium and magnesium minerals, which are naturally present in the water, are retained in the drink, offering nutritional benefits.



Richard Poyser comments, *"Robinsons set very high standards for their products with stringent quality control systems in place. The use of the Hydroflow water*

conditioning system has improved production efficiency and helps us ensure the high quality beverage that we demand".



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Heat transfer restored, corrosion inhibited in shell and tube exchanger

When a plant is fed by a hard water supply, limescale is soon deposited on surfaces where heat is exchanged. Scale blocks water passages, slows heat transfer, increases system internal pressures and promotes corrosion on vulnerable surfaces.



The traditional answer has been to introduce chemicals, some containing heavy metals and consequent environmental risk. All these products require significant expenditure plus stringent storage and health and safety procedures for chemical handling. It would be a real benefit to the maintenance budget if the damaging scale build-up could be cleared without hours of repetitive dismantling, chemical cleansing and interruption of the heat exchange process.

In this study, the requirement was to demonstrate the effectiveness of a Hydroflow C120 physical water conditioning unit when used on a scaled-up tube and shell heat exchanger. Success in the first stages of treatment would be judged by:



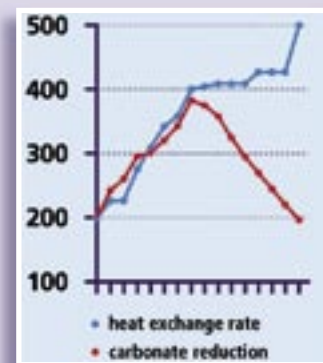
- Scale clearing from the blocked unit.
- No fresh scale deposits from incoming hard water.

Beneficial effects to limit corrosion would be noted during the study. Monitoring was to take place over nearly 5 months with monitoring at 5 day intervals.

The results of the study proved very positive from the word go. Only 10 days after securing the Hydroflow unit to the inlet pipe the calcium carbonate levels emerging from the outlet of the heat exchanger tubes had increased by 30%, implying the progressive removal of limescale. This measurement continued to increase until, at 7 weeks, it had reached almost double the initial reading, so scale was coming away fast! At this stage the heat transfer rate had also doubled from 200 kilocalories per hour (initial) to 400 kilo-calories per hour.

The calcium carbonate at outlet then proceeded to fall as the remaining scale was cleared from the heat exchange surfaces. Heat transfer rates went on rising until they reached 500 Kilo calories per hour at the end of 16 weeks. At this point, calcium carbonate readings had reached the same low levels at both inlet and outlet, flow was turned off and the heat exchanger opened. The photograph overleaf shows the success of the Hydroflow C120 unit:

- The heat exchanger lids and tubes were completely clear of limescale deposits.



Initial stages of the deposit of an oxidising film (Gamma Ferric Oxide) were noted on the metal. This film tends to inhibit corrosion.

Hydroflow had met all the study criteria for success. (Full report available on request)



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Maintenance hours cut, chemicals wiped out - spray jets clear of scale!

Rank Hovis McDougall is a pace setter in the food processing industry. The firm sets itself very high standards of hygiene and quality. This delivery of high standards often involves the drudgery of regular, repetitive maintenance at inconveniently short intervals. No-one likes to constantly be obliged to dismantle and re-assemble machinery plus issue special chemicals and safety equipment. Possibly back-up tooling has to be considered, and stocks of special components kept to hand.

Profitability is constantly eroded by the cost of labour, chemicals, protective clothing and spare parts and by the inefficient use of energy.



Wherever hot water is used in a process, if the plant is fed by a hard water supply, there is a constant risk of limescale being rapidly deposited in equipment of all types.

At McDougall's factory in Reading, Berkshire, high volume preparation of dry mixes for pre-packaged foods requires regular cleaning of the food bins.

Mr Mike Stamp, McDougall's site engineering manager worked with Wincanton Catering to design and install a custom built cleaning bay system. The food bins are cleaned in the system twice each day, by bombarding them with powerful spray jets installed in the base of the cleaning bays, and from rotating ball and jet nozzles fitted at the top. The cleaning solution heated to 60°C also contains sodium hypochlorite to break down fatty residues in the bins.

The cleaning system works well, but the hard water used led to a rapid build-up of heavy scale in the nozzles and jets of the spray fittings. Even when the temperature was reduced to 40°C for the cleaning solution, the scale had to be cleaned away twice per week.

Mike Stamp explained, ***"This situation necessitated the unpleasant job of dismantling the spray heads, then soaking them in in a strong chemical cleanser. Overall, this caused severe disruption to the production process."***

Following advice, a Hydroflow C60 descaler unit was installed. This was merely strapped to the water inlet for the cleaner bays. ***"The results were immediately impressive. Maintenance intervals have been slashed to once every 10 or 12 weeks instead of twice per week! Now a simple wipe over the nozzles replaces dismantling and soaking in chemicals"***.

McDougalls are delighted by the gains in efficiency, cost and productivity.

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Laboratory still limescale free - no acid attack!

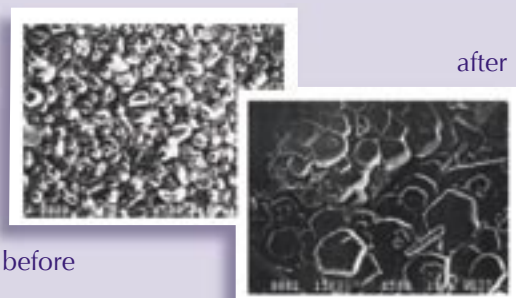
Supplies of distilled water are a regular requirement in chemistry laboratories. Many produce it using domestic water straight from the tap.

The chemist lab of the Royal Military College, Shrivenham is no exception and uses 10 litre capacity stills which are electrically heated. However, just like many other towns which lie to the south and east of the Humber to Severn line, Shrivenham has a hard water supply. Whenever hard water is heated, there is a risk of limescale deposits building up very rapidly.



This was the case for the Shrivenham scientists who regularly dismantled their stills and used acid to clean heavy scale encrustation from the glass vessels and electric heating elements. Repeated acid cleaning has also pitted the outer metal surface of each element, effectively reducing its life. It was important to use non-chemical products to treat the hard water, but none Shrivenham had tested work efficiently before. A Hydroflow HS38 unit was recommended.

Being chemists with access to sophisticated equipment, the Shrivenham team decided to carry out some comparative performance tests using the same still.



Starting from the still in a completely clean condition, observations would be made using a Hydroflow unit over a 6 week period. The still would then be cleaned, re-used for a second 6 week period without Hydroflow and fresh measurements taken. Scanning electron microscope and X-ray diffraction test equipment was available. This confirmed that calcium carbonate crystals form immediately following the super-saturation point of heated water.

In the case of Hydroflow, crystals were initiated more quickly and grew larger, with the salts crystallising onto these, 'Hydroflow crystals' rather than onto the glass or electric element. Further, the water was maintained at saturation point.

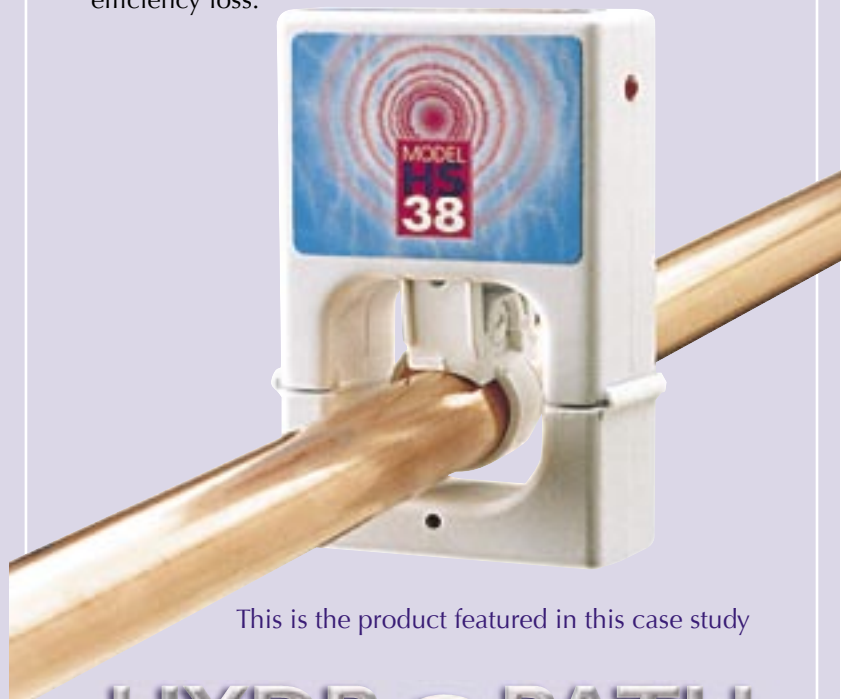
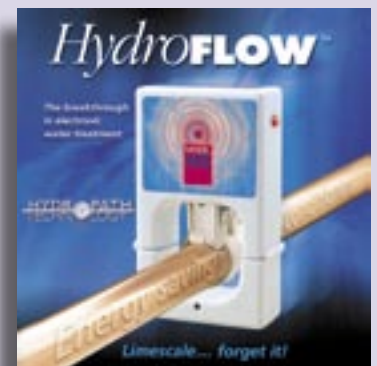
Hydroflow completely removed the need for acid cleaning, with the consequent health and safety precautions. The need to dismantle the still was also obviated.

The Royal Military College chemists are very grateful to have these repetitive chores removed from their work schedule.

Having passed the tests of demanding military scientists with flying colours, Hydroflow HS38 units have been permanently fitted to all laboratory stills.

The Hydroflow HS38 is primarily designed for the domestic home. This compact unit fits all types and sizes of domestic pipe and is designed for easy installation.

Hydroflow treats the system both up and down stream, prevents scale formation and in time removes existing scale. Hydroflow is easy to install (no plumbing-in), and once installed is maintenance free. The HS38 costs under £1 a year to run, and also saves money and energy. Just a little over 1mm of limescale coating the boiler heat exchanger can cause 10% boiler efficiency loss.



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Hellesdon Hospital, Norwich Limescale Protection/ Water Treatment/Heating

Hellesdon Hospital at Norwich is a mental health hospital that, like many Victorian era hospitals, has a main building with a number of satellite buildings and wards. Norfolk is an area with particularly hard water and as such, presents major problems for the Estates Department with regard to limescale build-up. This affects any heating system that comes into contact with water – so in addition to the Andrews water heaters, there have been recurring problems with the hospital's many tea boilers. This resulted in staff having to perform a descale every year.



The main building of the hospital utilises an ion-exchange water softener system but there are many outbuildings and boiler

houses that are not protected. The heating systems in these buildings, along with tea boilers had to be annually serviced by taking them apart and de-scaling by acid flush and physical scraping. Even so, there were periodic breakdowns caused by limescale build up. The Estates Department had previously tried an electronic water conditioner on one of the boiler houses but the results were disappointing.

The Hydroflow Trial

The hospital's Mechanical Supervisor, Tony Bezants had studied the application of electrical fields on liquids and was familiar with the principles. Whilst at the Plumbing and Heating



Exhibition (PHEX) in 2001, he met with representatives of Hydropath, the manufacturers of the Hydroflow water conditioning system. Tony purchased a Hydroflow HS38 unit and tried it on a tea boiler as this would allow an at-a-glance evaluation of how the system was performing. Within a very short space of time, Tony could see that limescale was not building up on the elements as it would normally. He then moved the HS38 to the old nursing accommodation block that had a traditional boiler and cylinder heating system. He also purchased a number of HS34 units for tea boilers and a combination boiler (as the

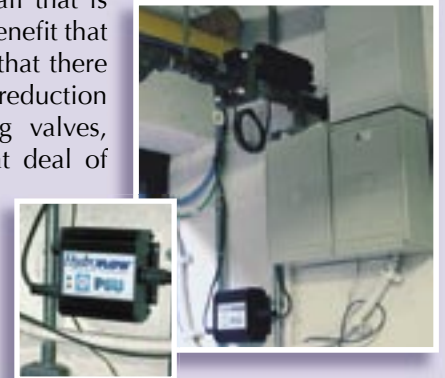


output of the HS38 was overkill for such tasks).

These further trials were also successful, so in summer 2002, Tony had a C60 unit, designed for larger and industrial applications, fitted to a stand-alone boiler house powered by over 10 Andrews water heaters.

The Results

The Estates Department team at Hellesdon Hospital no longer have to do an extensive descale of systems every year and there have been no more breakdowns as a result of limescale build up. A simple visual inspection of the elements is all that is required. Another benefit that they have found is that there has been a huge reduction in scale on mixing valves, which saves a great deal of staff time on breakdown and descale. It has not been practical to give an exact value, but Tony believes the savings made in fuel usage, staff time, chemicals and replacement parts have far out-weighed the cost of the Hydroflow units. Tony plans to add more Hydroflow units to other satellite buildings as budget allows and as part of the hospital's maintenance programme. Tony Bezants comments, *"I knew the principle of how electrical fields affect the physical properties of water and the Hydroflow technology appeared to be the best application of those principles. Due to the benefits I've seen at work, all but one of my 12 strong team now have Hydroflow units fitted on their systems at home."*



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Steam Boilers Asia

In Asia, as in the rest of the world, the Steam Boiler is used in industry in a variety of applications. The Hydroflow S Range is adaptable to cover all the range of Steam boilers on the market (except boilers used in steam turbines). From the small business requirement (e.g. laundry), to a large manufacturer utilising a four storey high Steam Boiler (for example the Palm Oil industry).

Steam Boiler operation requires expert water treatment management and the use of a large amount of chemicals. The Hydroflow S Range has been designed and developed to replace this conventional form of water treatment. It allows the safe operation of Steam Boilers, without the need for expertise in chemical water treatment. The large expense and the detrimental impact on the environment from chemical usage, is therefore eliminated with the Hydroflow S Range.



Mr James Leung is the independent distributor for all Asia. He has long standing experience in water treatment applications and a breadth of expertise in Hydropath Technology. He has been on the forefront of using Hydropath Technology to combat limescale in High Pressured Steam Boilers.

The Site: Cathay Murni Garment Factory, Indonesia. Hot water supply for washing and steam for ironing were supplied by



The S100 featured in this case study

a 20-year-old Fire Tube steam boiler. The boiler was kept in good condition by utilising a water softener and by adding corrosion-inhibitors. The boiler was cleaned annually. The make-up water, sourced from underground, has water hardness of 200ppm. Blow down was done once a day for 20 seconds.

Result with Hydroflow:

A Hydroflow S100 was installed at the inlet water pipe. The water softener was eliminated. For the first three weeks, blow down frequency was increased to 10 seconds per hour to eliminate/clean existing scale within the boiler. After three weeks, it was noticed that TDS at blow down dropped to below 1500ppm. In order to save fuel, blow down frequency was changed to once a day. It was estimated that fuel consumption was reduced by 30%. The boiler was then opened for inspection and it was free from hard scale.

The Site: Felda Penggeli factory, Johor, Malaysia
The boiler, made by Vickers Hoskins, is 4 storeys high.

Application: Water Tube Steam Boiler, 45 Tons at 450 PSI. This very large boiler is common in the Palm Oil industry. Water with hardness at 60ppm was taken from the river nearby. Although the water softener was used, scale was still found inside the boiler. Felda Penggeli management wanted to use Hydroflow as a secondary protection for the boiler. One Hydroflow S120 and one C100 were installed in September 2003. Automatic blow down was set at 20 seconds in 25-minute intervals.



Result with Hydroflow:

After three months, the boiler was opened for regular inspection. No limescale was found inside the boiler. TDS at blow down was maintained at 1000ppm.

Other High-pressure Steam Boiler Applications throughout Asia where Hydropath Technology has dealt with Limescale.



TKO Landfills Site (Hong Kong):
8 Tons Steam Boiler.



Gelmart Industrial Factory (Philippines,
Manila): 4 Tons Steam Boiler



Trinuggal Garment Factory (Indonesia):
10 Tons Steam Boiler



Batu Pahat Garment Industries
(Malaysia): 6 Tons Steam Boiler.

Also:

Kien Hung Fish processing Plant (Vietnam)

PT Firman Jaya Dua Saudara Garment Factory (Indonesia):
13 Tons/12 Bar Boiler

Ma On Shan Steel Factory (China):
35 Tons/2.45Mpa Steam Boiler

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Over-coming limescale problems at JV Murcott

JV Murcott is an aluminium high-pressure die-casting specialist based in Tamworth. They specialise in the design, development and manufacture of



complex, precision, structural, safety critical castings, finished parts and assemblies. Their customers include Nike, IBM, BMW, Jaguar, Rolls Royce and Triumph Motorcycles and all demand the highest standards.

The Problem

Located in an area of hard water has always caused production problems, particularly with regard to cooling the dies. Cold water is pumped through very hot dies, through relatively narrow waterways; these are prone to limescale build up and eventual blockage, which could lead to the die overheating.



Alan Bullick, (shown above) JVM's Maintenance Manager's only solution has been to strip down the dies twice a year. Each machine is made of steel and weighs between 10 and 20 tonnes; each has between 6 and 8 dies. These would have to be taken offline, stripped down and the waterways drilled out. This would take 7 to 8 hours to strip down, 15 minutes to drill and then a further 7 to 8 hours to rebuild.

Another problem they faced was in their cooling towers. Not only did limescale accumulate there, but legionella also builds up. Twice a week, dip slides would have to be taken and then put in an incubator to monitor levels. A typical reading was 103, but once the reading had reached 106, then the cooling towers would have to be shock dosed with 3 litres of Sodium Hypochlorite. If too much is added, there is a risk of corrosion to the internal pipework. The cooling tower would also have to be taken offline twice a year and the limescale removed from the 'V' troughs and filter packs. They were usually coated with limescale and the cleaning process took 3 hours.



The Solution

In the summer of 2005, Alan Bullick did some research on the internet and discovered Hydropath's range of water conditioners. He had heard good reports of the technology and decided to contact the company. After a number of

consultations, Hydropath's Technical Director, Dr Daniel Stefanini suggested the Aquaklear P120 unit. One Aquaklear P120 was installed to protect one of the two production lines and the associated cooling tower in July 2005. This one unit protects all the machines.



The Results

The dies were cleaned at the time of the Aquaklear installation. The usual inspections were done 6 months later, in line with the historical maintenance requirements. Alan was 'astonished' by the results; the dies had no limescale build-up and build up was virtually non-existent in the cooling tower. The usual 3 hour clean of the cooling tower took under an hour.



Another bonus for Alan relates to the legionella. Legionella levels were not the reason for the installation of the Aquaklear unit, but because it kills bacteria, legionella levels have dropped dramatically, from the usual 103 to 101 – well within acceptable health and safety levels.

As a result of the successful trials, Alan will be adding another Aquaklear unit to the second cooling tower and the older, second system of die casting machines.



Alan comments, *"I was a bit sceptical about the effect that the Hydropath water conditioners would have but have been amazed at the results. It has all but removed a major production and maintenance headache for us, which has saved us time and money. We are also reducing the amount of chemicals that are needed to control legionella levels, so that's got to be good for the environment too."*

This is the product featured in this case study



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Life of humidifier elements increased - acid cleaning and disposal eliminated

Britannia Airways, based at Luton Airport, has to maintain a permanent constant humidity level in its computer rooms and hangars in order to eliminate the build up of static electricity. The efficiency of the humidifiers supplied by Vapac and J.S. Humidifiers Ltd was being severely compromised by the continual formation of heavy scale.

The humidifiers required descaling within one month of installation and the deposit was so hard that only acid cleansing was effective. This involved a twenty four hour operation and the careful disposal of acid waste. The progressive damage to the metal heating elements reduced their effective life to only 3 months.



The use of Hydroflow's unique system of scale prevention was recommended. A Hydroflow unit was installed on a Vapac humidifier in the Britannia Operations Room. After two months testing an amount of scale still accumulated on the element and on the bottle's base but this could be knocked off without the need of acid treatment.

The Hydroflow system is now in general use by Britannia in London Luton Airport. Monthly maintenance takes two hours instead of twenty-four. No acid disposal is required and the life of the elements has been greatly extended. Paul Dunn, Support Services Supervisor of Britannia Airways, is delighted. He says, "Cleaning the bottles used to be regarded as a punishment detail. Now it is a pleasure".

It is also noticeable that the amount of scale forming in the humidifiers is still reducing, implying that the heavy deposits in the trial bottle were partly the result of descaling existing deposits in the whole system. The whole system was therefore improved and the life of the elements was greatly extended. (Full report available on request).

Installation of Hydroflow system is a simple operation. The compact unit is strapped onto the cold water inlet pipe and plugged into the mains electricity. Randomly varying electric fields are introduced into the water which prevent the deposition of encrusting limescale. Hydropath's system is maintenance free, requiring no plumbing or chemicals.

The Costs of Scale in Boiler Systems

| Scale Thickness (mm) | 0.4 | 0.8 | 1.6 | 3.2 | 4.8 | 6.4 | 9.6 | 12.7 | 15.9 | 18.1 |
|--------------------------------|-----|-----|-----|-----|-----|-----|-----|------|------|------|
| Gallons of Oil Wasted per 1000 | 40 | 70 | 110 | 180 | 270 | 380 | 480 | 600 | 740 | 900 |
| Pounds of Coal Wasted Per Ton | 80 | 140 | 220 | 360 | 540 | 760 | 960 | 1200 | 1480 | 1800 |
| Gas Wasted Per 1000 Cubic Feet | 40 | 70 | 110 | 180 | 270 | 380 | 480 | 600 | 740 | 900 |
| Average Efficiency Loss | 4% | 7% | 11% | 18% | 27% | 38% | 48% | 60% | 74% | 90% |

The Costs of Scale in Cooling Systems

| Scale Thickness (mm) | 0.5 | 1 | 2 | 4 | 6 | 8 | 10 | 12.7 |
|----------------------------------|------|-------|-------|-------|-------|-------|-----|------|
| Decrease in Condensing Capacity | 5% | 9% | 17% | 27% | 29% | 34% | 50% | 56% |
| Increase in Condensing Temp (°C) | 0.4 | 0.8 | 1.6 | 3.2 | 4.8 | 6.4 | 8 | 10 |
| Increase in Energy Required | 5.8% | 10.6% | 20.2% | 29.4% | 35.6% | 46.8% | 66% | 76% |

The Effects of Limescale

Limescale builds up in heat exchangers, pipes, pumps, boilers and appliances connected to the system. This usually results in reduced flow rates, loss of efficiency and early failure of components.



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The Range

| Model | Brief Description |
|---------------------------------|--|
| Hydroflow HS38 | Limescale protection for the average size home |
| Hydroflow HS40 | Limescale protection for domestic properties with larger pipe sizes. For the USA home |
| Hydroflow C Range | Limescale protection for industrial/commercial applications. |
| Hydroflow S Range | Limescale protection for industrial/commercial Steam Boilers |
| Hydroflow Ex Proof Range | Limescale protection for industrial/commercial applications. Certified to Zone 1 and Zone 2 ATEX compliance |
| Aquaklear P Range | Protects from limescale, bacteria and algae that cause chloramines, THMs etc. Designed for commercial pools & cooling towers |
| Aquaklear J62 | Protects from limescale, bacteria and algae that cause chloramines, THM's etc. Designed for small & domestic swimming pools |
| Spaklear W63 | Protects from limescale, bacteria and algae that cause chloramines, THMs etc. Designed for the commercial spa |
| Steamklear S38 | Limescale protection for low pressure Steam Generators e.g. the health club steam room |
| Agriflow A Range | Protection from limescale, bacteria and algae problems in commercial broiler rearing houses & other agricultural applications |
| Agriflow J60 | Protects from limescale, bacteria and algae problems for smaller agricultural applications e.g. ornamental water fountains, koi carp ponds, cooling mats etc |
| Custom Range | Hydropath's electronic water conditioners can be customised to suit outside pipe sizes (larger than 200mm outside diameter) |



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Welcome to our Case Study Information Pack
 for Hydropath Holdings Ltd.
 We present to you



*THE name for the worlds leading
 electronic water conditioners*

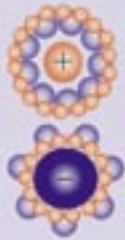
With nearly 20 years experience, Hydropath's patented technology offers environmental benefits and cost saving solutions that deal with limescale, as well as bacteria and algae. We successfully work in the demanding industry of heating and ventilation, the leisure and agriculture industry, and in all fields of water treatment



www.hydropath.com

All of our electronic water conditioners utilise Hydropath Technology. This wholly unique technology does not work against nature, but encourages the natural physical reaction to occur not on the heat exchanger, not on internal surfaces but in suspension.

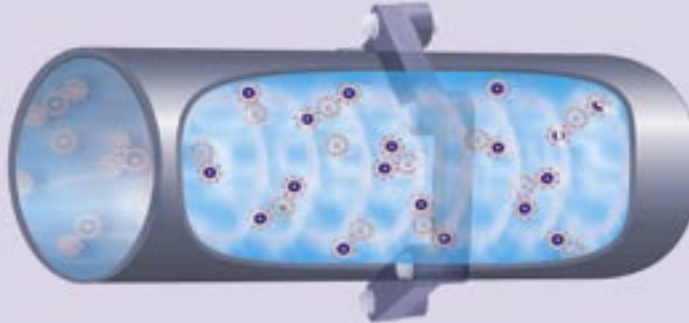
Our technology works by emitting randomly varying electric fields throughout the system, enhancing the precipitation of bicarbonates from solution to suspension. Clusters of ions are generated in the water from randomly distributed calcium and carbonate ions. These clusters act as seeds for calcite precipitation in suspension, therefore the resulting suspension does not adhere to pipe work or internal surfaces, but is merely 'washed away' with the flow or during blow down.



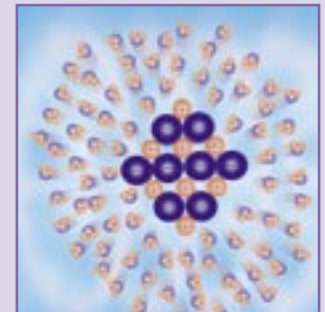
Positive and Negative Hydrated Ions



Section of pipe wall showing sharp points concentrating electrons which attract the ions for precipitation to surfaces.



The emitted varying electric fields cause the Hydrated Ions to form clusters in suspension instead of on the pipe walls.



Implosion of the Hydrated Ions forming crystal nuclei.

LIMESCALE

Limescale is a significant insulator: just a small coating of limescale of 1.6mm on a heat exchanger in a boiler system can reduce its efficiency by an average of 11%.

The build up of limescale usually results in reduced flow rates, loss of efficiency and early failure of components e.g. Plate/Tube Heat exchangers, Calorifiers, Cooling Towers, Dearators etc. Limescale can also cause corrosion.

In hard water areas throughout the world limescale will increase energy costs, hence increased water wastage, cost to our environment, and of course increased financial costs.

In industry, limescale build-up can regularly curtail production. CIP (Clean-in-Place) can often take days, much people power, and high acid/chemical usage. But this is just a short-term solution.



Hydroflow offers the long-term solution:-

chemical free - maintenance free.

Hydropath is an ISO 9001 Registered Firm, based in the UK and all our products are certified to the requirements of ISO 9001:2000. Products have a one-year fit for purpose warranty and three-year guarantee.

We have independent distributors working through all five continents of the globe. Offering a wide variety of services from technical support to site visits for the complex applications. Please look on our website or contact us directly for a distributor near you, who can offer further technical assistance.

Hydropath Technology can be found in hospitals, supermarkets, restaurants, housing, airports, farms, leisure clubs, hotels, in factories and offices - In fact wherever limescale, bacteria and algae hinder industry in action!

BACTERIA AND ALGAE

Bacteria and algae cause problems for the leisure industry in swimming pools/spas, in agriculture, in cooling towers for industry etc. Control of this leads to high operation costs, continual supervision, and high chemical protection along with complicated dosing programmes.

In succession to the Hydroflow, which deals with Limescale, Hydropath has also developed ranges of water conditioners proven to reduce bacteria and eradicate algae. Hydropath Technology can help with reduced dosing regimes, reduced backwashing, improved filtration, and many more benefits besides. These conditioners have the effect of killing bacteria and algae. They do so by applying a charge to the bacteria which becomes hydrated with a pure water layer. This layer is absorbed into the bacteria by osmosis, creating osmotic pressure which bursts the membrane, thus killing the bacteria.

Algae and bacteria form a cyst, which is virtually impossible to filter out via normal filtration. A cyst is an almost indestructible seed that bacteria produce when conditions are difficult. The bacteria can then quickly reproduce to a fully-fledged bacteria when conditions improve. Our water conditioners will also resolve this problem by flocculating these suspended micro particles in order to allow filtration to be possible.

Please note that our full range of water conditioners protect against limescale by propagating the signal throughout the given system, yet for bacteria and algae to be treated correctly, water needs to flow past the conditioner.