

Case Studies

BUSINESS USER CASE
FOR INSTALL OF



Commercial Office Tower Canary Wharf

Application

Commercial Tower heat network

Challenge

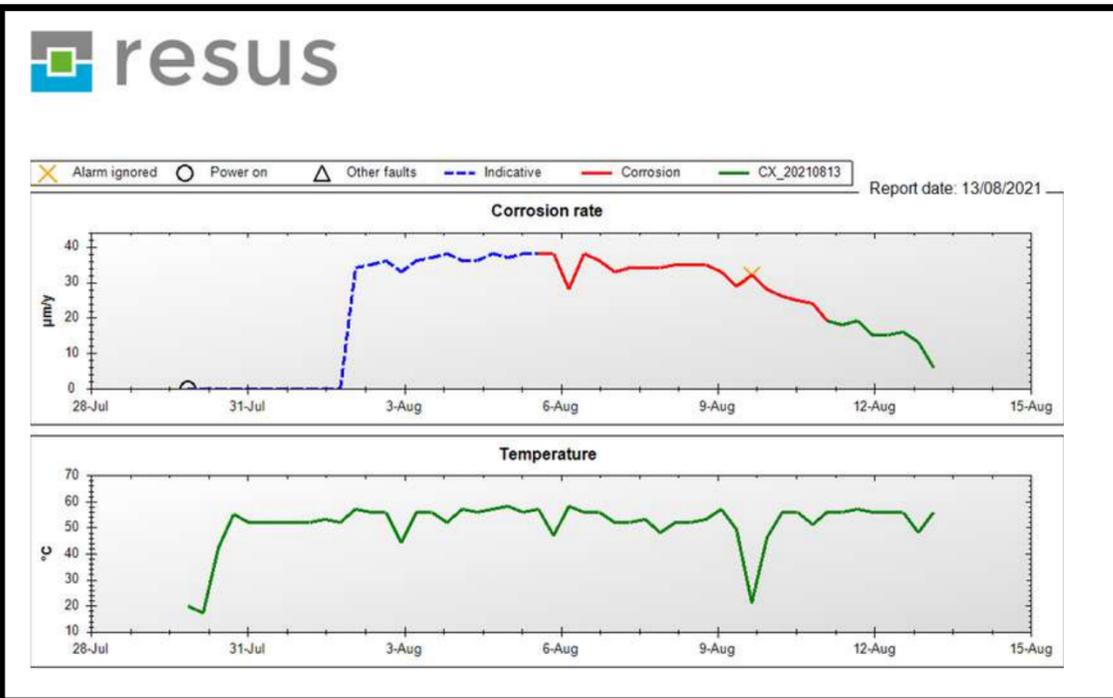
- Three of four 1MW boilers failed in first two months of operation
- Warranty invalidated due to VDI2035 water quality not met
- Conductivity of 2100 uS/cm
- Boiler manufacturer required a reading below 300 uS/cm for new warranty
- End of July and boilers had to be operational by start of heating season

Actions and results

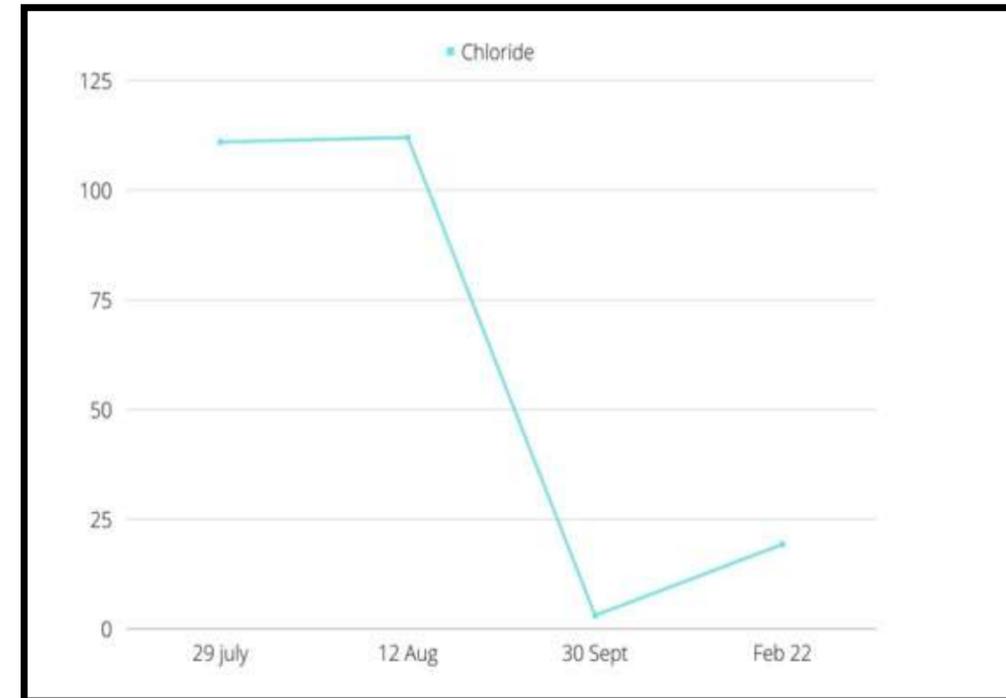
- Reaction tank and main water filter unit installed
- Temporary water filtration installed side stream to speed cleaning process
- Conductivity reduced to 37uS/cm within 30 days
- Temporary rigs removed, reaction tank remains to protect system
- Achieved saving of over 50% on flush cost and within time limits set by the client.

Canary Wharf Tower Trend Analysis

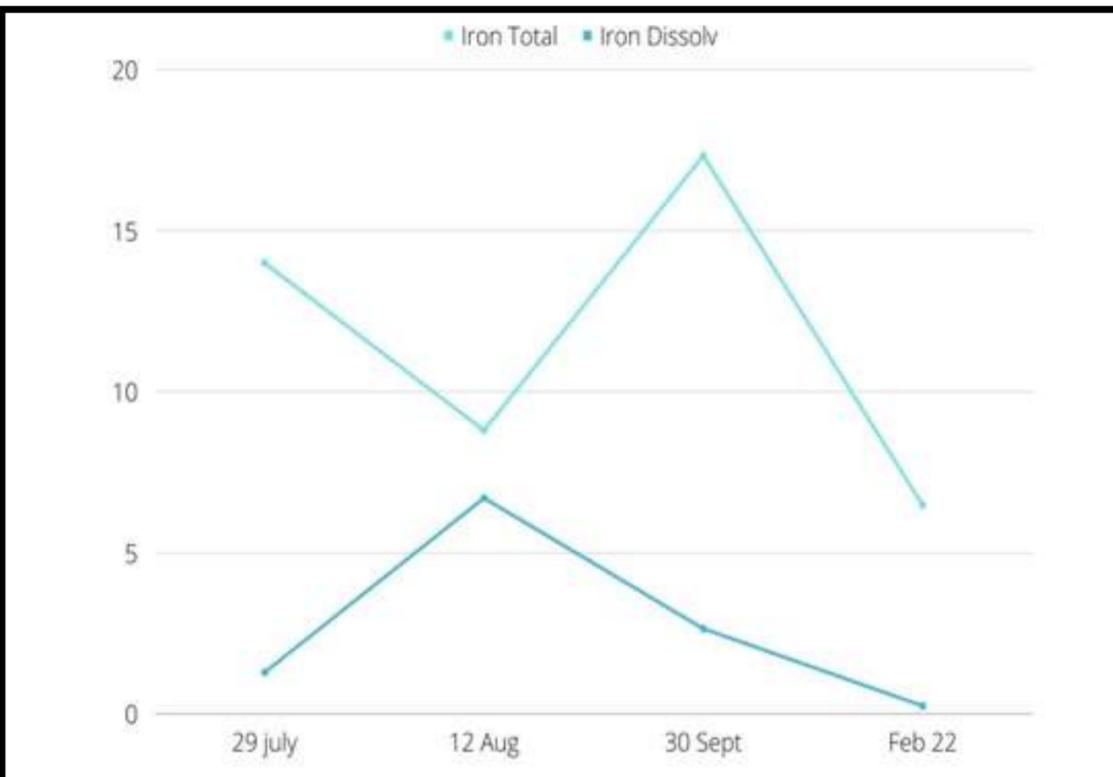
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The Resus meter measures the corrosiveness of the water in microns. The meter indicates a starting point of 38 before moving the water to a non corrosive state (>20 microns) in just six days eventually achieving 0.2 microns.

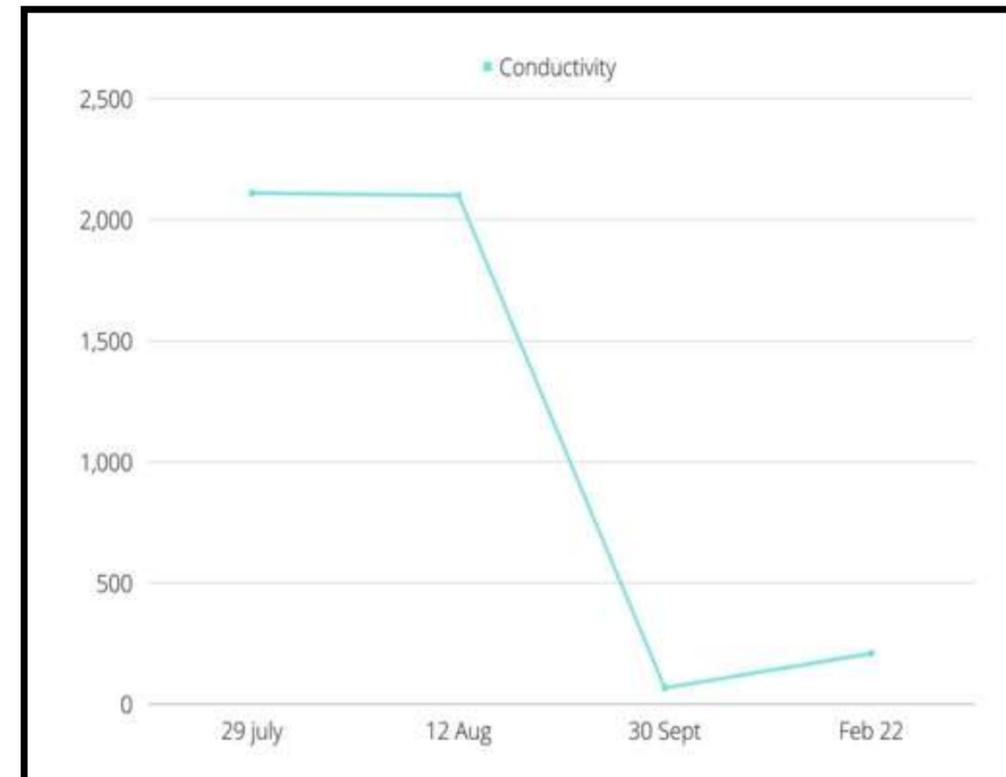


Both Chlorides and the conductivity fall in line with each other and are taken to full VDI2035 controls.



TDS and dissolved metals will increase as we move the debris into circulation before reducing back down to controlled levels.

Whilst dissolved irons spike they are quickly reduced to 0 showing corrosion has been controlled in the system.



The rise in each is due to the resin not being replaced and raw fill water entering the system.

The replacement of the resin saw the levels return to controlled VDI levels.

This indicates the importance of the maintenance regime



Application

- High street bank datacentre – primary chilled network
- (project overseen by client appointed expert witness)

Challenge

- High bacteria count
- Client appetite for more sustainable solution
- £70,000 proposed cost for alternative chemical flush
- Client requirement for functioning solution

Results

- Total viable count (TVC) reduced by 90%
- Chlorides reduced by 48.6%
- Dissolved Irons (indicator of ongoing current corrosion) reduced by 26.4%
- Project signed off at 45 days into 90 day period by expert witness

Expert witness 90 Day Summary

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The trial will be deemed a success if the trend analysis during the 90 day period indicates all key parameters are moving towards VDI acceptability

| Test Name | Sample Location | | | | | | | % Reduction in key parameters towards VDI control | VDI 2035 |
|--------------------------------------|---|---|-------------------------|---|---|---|-------------------------|---|------------|
| | 12/04/2021 Copley B - Secondary B Pump P/B/05 | 26/04/2021 Copley B - Secondary B DFU #011 | Average value (1) | 26/07/2021 Copley B - Secondary B Pump P/B/05 | 26/07/2021 Copley B - Secondary B DFU #011 | 26/07/2021 Copley B - Secondary B DFU #013 | Average value (4) | | |
| pH | 9.4 | 9.4 | | 9.2 | 9.2 | 9.2 | 9.2 | | 8.2 - 10.0 |
| Electrical Conductivity @ 20°C / µS | 1110 | 1126 | 1118 | 716 | 716 | 726 | 719 | 35.7% | 50 - 100 |
| Hardness, Total as CaCO ₃ | 17.4 | 16.2 | 16.8 | 26.6 | 27.9 | 26.9 | 27.1 | | 10 - 200 |
| Chloride as Cl | 20.2 | 23.3 | 21.8 | 11.2 | 11.2 | 11.2 | 11.2 | 48.6% | 10 max |
| Iron, Dissolved as Fe | 5.51 | 5.91 | 5.71 | 4.15 | 4.18 | 4.26 | 4.20 | 26.4% | 0.10 max |
| Copper, Dissolved as CU | 0.17 | 0.27 | 0.22 | 0.18 | 0.17 | 0.17 | 0.17 | 22.7% | 0.02 max |
| TVC @ 22°C (cfu/ml) | 2660 | ~3080 | | 410 | 330 | 270 | | ~90% | <10 |
| TVC @ 37°C (cfu/ml) | ~3200 | 2160 | | 200 | 280 | 200 | | >90% | <10 |
| Pseudomonas spp cfu/100ml | ND | >150 | | ND | ND | ND | | | Nil |

The table above has been extracted from our report and clearly shows that the key parameters for VDI control limits, when comparing values at the beginning and end of the 90 day trial, are either at VDI required levels (parameters marked as green) or have been markedly reduced and are moving towards VDI values.

Therefore, based on this criterion the trial has been a success.

NHS Ulster - Acute Northern Ireland Trust

Issues

- Water quality issues since opening of unit
- High counts across all areas of analysis
- PIC Valves failing 4-5 per week at £350 per valve to replace
- Cost of chemicals at £60,000 per annum
- Quoted £280,000 for chemical flush and clean

Actions and results

- Install of Protector solution across multiple networks
- Rinsed each network 4-12 weeks post install
- Temporary side stream filter installed on stubborn CHW
- ROI recovered in 10 months
- Operating expenditure reduced to under £2,000
- Valves no longer failing and breakdowns not occurring
- Chemical free now adopted for new ward

South Acton

L&Q

Bollo Bridge Road's District Heating Network (DHN) was suffering from poor water quality resulting in component failure in boilers, pipework, HIUs and pumps. This led to downtime in the system and residents left without heating and hot water. More chemicals had been added to the system but just increased seal and gasket failures through overdosing. This left L&Q facing a £27k chemical clean bill.

Instead, L&Q selected a our chemical free solution to be installed at a combined cost of under £11,500. This gave an immediate Return on Investment (ROI) with no disruption to the operation of the building.

With bacteria levels reduced to within VDI2035 guidelines the 90 day Proof of Concept (POC) was signed off after 45 days. The DHN operator, Vital Energi, saw call outs fall from 7-10 a day to less than 2 a week with an area engineer taking over what were the responsibilities of 2-3 site based engineers.

Vital and L&Q are now two of our biggest clients and their satisfaction is evident in one of our most recent awards in the 16,000 unit Barking Riverside development.

L&Q were one of our first clients on setting up the UK office and are now one of our biggest. We will have completed over 60 L&Q projects in the 2021 financial year as they look to be the first housing association to go chemical free in their closed loop water treatment.

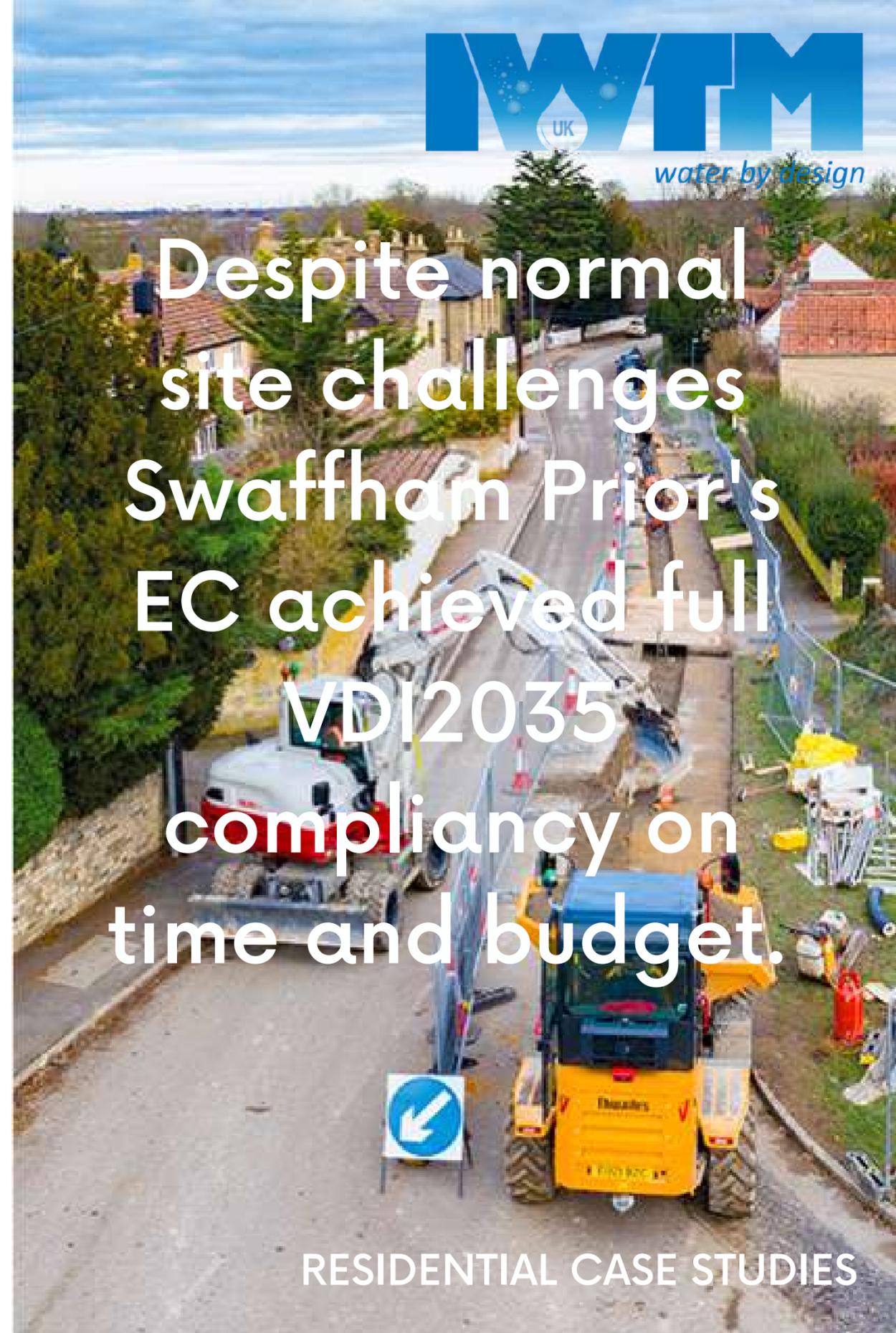
Swaffham Prior

The 300-home village is the first retrofit of a heat network into an existing community. With most homes having oil fired boilers Cambridgeshire CC wanted 100% of the thermal energy demand to be met by renewable energy. The project consisted of developing the energy centre (EC), the buried pipe heat network, heat interface units (HIU) to each home and a solar farm to create a renewable energy source to power the EC.

The gradual take-up across the village meant that certain pipework sections would contain stagnant water. This meant a conventional approach to pre-commissioning cleaning and treatment using chemicals was unlikely to reliably control bacteria levels and could result in poor water quality and bacterial growth.

IWTM's chemical-free principles offered not only a saving on £30k of chemical costs but also the benefit of suiting low or intermittent flow networks such as Swaffham. The solution consisted of an array of two IWTM Industrial T1000s and 3 demineralisation units in array to cater for the 600,000l system volume and VDI2035 water quality standards were adopted across the project.

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Despite normal
site challenges
Swaffham Prior's
EC achieved full
VDI2035
compliance on
time and budget.

RESIDENTIAL CASE STUDIES

Midland Corrosion Services' (MCS) testing with IWTM's chemical free water treatment units showed its ability to significantly reduce dissolved oxygen (DO) and conductivity levels, and control pH, all major contributors to corrosion in closed loop networks.

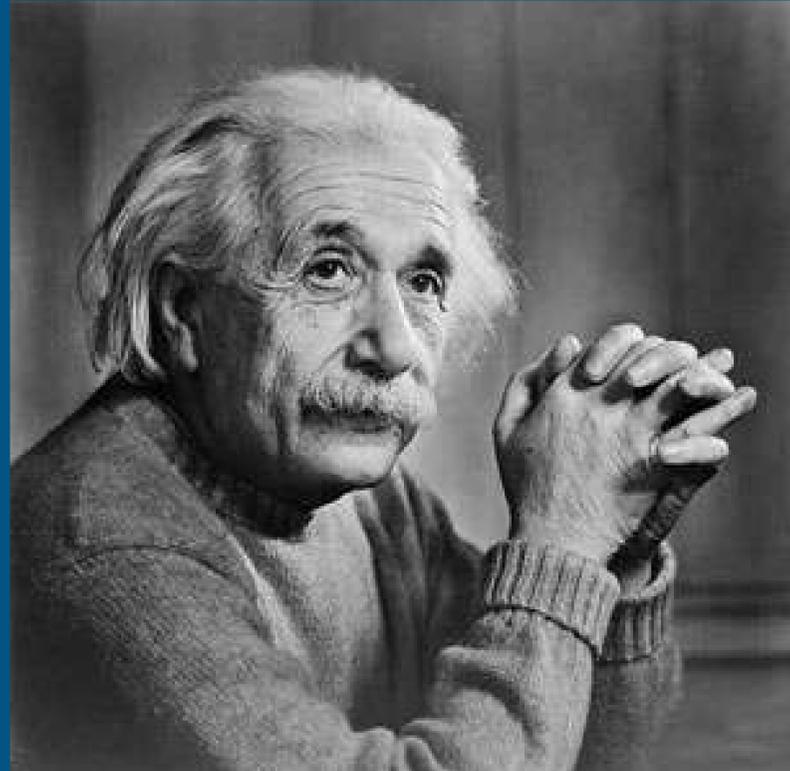
MCS, one of the UK's leading independent corrosion specialists, were commissioned to test the systems ability to control both DO and conductivity and performed a number of controlled tests on a specially designed LTHW rig.

Five tests were completed including a control which set the baseline results of the characteristics of the test rig across a 7-day period for each. The tests reported reductions in DO of up to 90%. The corrosion rates of steel decreased by 25% over the course of the 7-day trial and the conductivity showed a decrease across all tests especially when used in conjunction with IWTM's demineralisation unit. Within the same timeframe, pH was also seen to achieve the stringent VDI2035 levels of water quality.

The results led MCS to state, "Undoubtedly the device scavenges out oxygen while maintaining conductivity at a low level and therefore reduces corrosion and supports the attainment of VDI 2035".



water by design



The definition of insanity is repeating the same behaviors and expecting a different outcome.

Albert Einstein