

Over-coming limescale problems at JV Murcott

The Background

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

Being 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, 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 10^3 , but once the reading had reached 10^6 , then the cooling towers would have to be shot dosed with 3 litres of Sodium Hypochlorate. 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 would usually be coated with limescale and the cleaning process would take three 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. It is a patented physical water conditioner that prevents the build up of all limescale deposits, including calcium carbonate, 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 and during blow down. The Aquaklear also has the effect of killing bacteria and algae. It does so by applying a charge to the bacteria which gets 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 not conducive. The bacteria can then quickly reproduce to a fully-fledged bacteria when conditions improve.

The water conditioners will also resolve this problem by flocculating these suspended micro particles in order to allow filtration to be possible. As with all Hydropath's water conditioners, limescale protection is offered to the entire system by the propagation of the signal, yet for bacteria and algae to be treated, water needs to flow past the conditioner to be treated correctly.

One Aquaklear P120 was installed to protect one of the two production lines and the associated cooling tower in July 2005.

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 10^3 to 10^1 - 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."

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For further press information or photographs, contact Paul Brook on 0115 9690182 or email paul@freestyleuk.com.