



Cleaner Components and Greener Credentials

Case Study

Graham Fraser, MD of Fraser Technologies, discusses how the next generation of cleaning technologies cut costs, time and carbon footprint for a large automotive customer.

When considering how to clean or degrease products or components, businesses will find they are faced with a choice between water-based aqueous cleaning and using solvents.

There is a great deal of misinformation in the public domain and general opinion regarding solvents, which will inevitably have an impact on this decision. Indeed, many people steer clear of solvents altogether due to their controversial history. What a lot of people might not realise, is that there is an impressive new wave of cleaning technologies. These new fluids provide an environmentally friendly option which can save time and money, while also reducing our impact on the planet.

For businesses looking to improve their cleaning and degreasing processes, as well as make choices that reflect their company vision and commitment to better environmental awareness and practices, solvents should most definitely be a part of the conversation.

This is something we have been working closely on with a leading automotive power management company, based in the Midlands, with excellent results.

This large automotive manufacturer manufactures a range of integrated hydraulic products, including screw-in cartridge valves (SiCV) and hydraulic integrated circuits. They had cleaned their products with a variety of materials over the years, initially operating with trichloroethylene, before switching to an aqueous-based process.

They were finding a number of issues with the aqueous processes, essentially related to the age of the cleaning equipment, the level of cleanliness achievable with aqueous cleaning, and the potential for 'flash rusting' at the end of the process.

To assess the cleaning processes in detail and to ascertain an alternative solution, we arranged a visit to their facility in the Midlands. We observed that they had two aqueous cleaning systems on site: a four stage immersion tank system, consisting of a chemical cleaning tank, two rinsing tanks and a hot air dryer chamber; and a spray wash system.

Both systems took up a great deal of floor space, and the control of chemistries was a manual process, needing constant checks by a skilled operator.

The Challenges

A variety of parts go through the cleaning processes, ranging from large manifold blocks (of up to 450 x 300 x 300mm) to smaller components, which are loaded into trays.

The parts are used in a variety of hydraulic applications, from mobile industrial equipment to automotive platforms, with strict cleanliness requirements to maintain valve life. They all need to meet the strict cleaning standards of BS4406, with a maximum particle count of 0.6mg/kg and a maximum particle size of 250 microns for the most sensitive application. The parts must be gravimetric tested to give a residue reading, to ensure the appropriate levels of cleanliness performance have been met.

It was immediately clear that a solvent cleaning process would optimise the entire operation. The fact that trichloroethylene had been used successfully in the past suggested that solvents did work in this application, and indicated that the products would be compatible with newer generation solvents.

We recommended that solvent cleaning would offer a much higher cleanliness standard than aqueous cleaning, due to its low surface tension and final rinse in pure solvent vapour. As solvents are a 'dry' cleaning option, this process is ideal for difficult to dry components. Opteon™ SF79® was deemed to be the most suitable chemistry solution. With the use of low boiling point, non-flammable products, the components would be cleaned to an exceptionally high standard with minimal cost and capital investment.



An example of the previous aqueous cleaning system the customer was using.

There were two ways of delivering the process. This particular factory is broken down into product specific cells, so one solution was to have several smaller solvent cleaning systems, with one allocated to each cell, or shared between 2 or 3 cells. Alternatively, they could opt for one fully automated Solvac S2 500 cleaning system. It works in exactly the same way as the smaller 'cell' systems, but has full automation. Baskets are loaded onto a roller conveyor, where they are picked up by a handling system and stepped through the process.

With this system, the operators simply load baskets onto the infeed conveyor and remove from the outfeed at the end of the process. It would be located in a similar central position to the existing aqueous machines, but only required power and air supply. The client opted for one machine, as it better suited their production flow and reduced handling.

"With the use of Opteon™ SF79®, the components are cleaned to an exceptionally high standard with minimal cost and capital investment."



An example of the variety of different components the customer was needing to clean.

The Results

The customer's team found that the results have been better than they anticipated. A solvent recovery system was installed at the same time as the Solvac equipment, which puts the solvent through a distillation process so that it can be used again. 90% of waste solvent is now recovered for reuse, which has reduced what they have needed to buy, as well as reduced waste handling costs.

The team has been so impressed, that they have been back to us to help with their other sites, including supplying a machine to Mexico and another small batch system for the facility in the Midlands, allowing them to increase capacity in the cleaning process to meet greater demand for the product.

The OPEX Manager commented "The report that came back from Fraser Technologies was clear – a solvent solution would save us money in the long term, and would provide a more consistent superior clean."

"The latest generation of solvents are reducing our clients' carbon footprint by 25% and using five times less power than previous aqueous systems."

"With improvements to be seen on not just the quality of the clean, but also productivity, maintenance, safety and our environmental impact, we were able to very easily justify the capital expenditure. Since the machine was installed in June 2016, the results have more than lived up to our expectations – the cleaning is technically superior; and we can see the difference that the machines are having on our carbon footprint, as well as our business, as the cost of heating water and air has gone from around 40kw to 8kw."

We are seeing time and time again that the latest generation of solvents are reducing our clients' carbon footprint by 25% and using five times less power than previous aqueous systems. The old solvent technology has been reintroduced with a modern variant – they can be fully automated; they're much safer for people, significantly reduce the impact on the environment; and they deliver unbeatable results.



The new automated system installed by Fraser Technologies for the customer.

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