



## Case Study Fraser Technologies ensures efficiencies for pioneering aerospace company

Over the past six years, Fraser Technologies has been working with a well known, midlands based, leading aerospace engineering company to provide them with extremely high levels of cleaning performance for their mechanical components.

As a leading engine producer for large civil aircraft, corporate jets, and defence aircraft, the company is world-renowned in high-speed jet engines, so the requirement for precision and superior levels of cleanliness is easy to understand. The company provides its customers with a single solution for the design, manufacture, procurement, testing and support of high-integrity, harsh environment control systems, including safety critical software, electrical and hydro-mechanical products.

They are responsible for delivering a large variety of products including Fuel Pumps, Variable Stator Vane Actuators (VSVAs), Hydro-mechanical Metering Units (HMUs), Engine Electronic Controllers

(EECs), Fuel Spray Nozzles, and Permanent Magnet Alternators. Together the products and systems deliver fuel to the engine combustion chamber at the required flow and pressure, enable engine start and shutdown, control the engine to give the required propulsive thrust, and prevent the engine exceeding desired or safe operating conditions.

Each part needs to be spotlessly clean – with maximum particle sizes of just 10 microns – in order to perform its role. The team uses a coordinate measuring machine (CMM) to ensure each component is machined to very accurate tolerances. The tolerances for measurement are just five microns, so even small particulate material has an impact on this process.

*“When every part of a product needs to be of the highest quality, it is imperative that the cleaning standard of every component is too.”*



# The Challenges



With demand for ever higher levels of cleanliness and increased efficiencies across the business, the company identified that improvements could be made in some of their component cleaning processes.

They were finding some residual material contamination on machined and de-burred surfaces on the VSVAs and fuel metering units, which was preventing measurement and evaluation by the CMM. This meant parts had to be removed, hand washed, checked and cleaned manually, which was adding significant time and labour on to what should be a straight-forward process.

As the company already worked with Fraser Technologies in other parts of the business, Fraser Technologies was the partner of choice to help. Headed up by managing director, Graham Fraser, the team worked closely with the manufacturing engineers and technicians to explore and trial alternative cleaning processes in an effort to remove the need for retesting and ensure the brand's superior standards of quality first time, every time.

*'With a company like this, every product without exception must be cleaned and degreased to the very highest standard.'*

**Graham Fraser**  
Managing Director  
Fraser Technologies



# The Method

The company had been using an aqueous system to clean the VSVAs and fuel metering units, and Fraser Technologies was keen to trial a solvent solution, which they believed would deliver the best results.

Providing their fully bespoke cleaning system service, expert analysts conducted a site visit and evaluated the specific cleaning needs and existing processes, before making detailed recommendations for both equipment and chemistries.

Fraser Technologies recommended Opteon™ SF79®, which can remove particulate down to submicron levels without leaving residues, and unlike solvents of the past, has strong environmental credentials, with a GWP of less than 15. GWP is used to represent the equivalent of CO2 being released into the atmosphere, where 1kg of CO2 is equivalent to a GWP of 1. For companies looking to improve their overall environmental impact, low GWP materials such as the Opteon™ range from Chemours™ should be the go to product of choice.

SF79® was already used elsewhere in the business and had been approved on site, so they had confidence in its credentials and capabilities. In order to demonstrate the quality of the process and the solvent for this specific application, cleaning trials were carried out on test parts. These were adapted and repeated until it was evident that the components were consistently passing CMM testing first time.

Replacing the aqueous system with a solvent was a big attraction, as it would provide them with a number of benefits, including improved technology, which would make the job easier and faster. The cooler temperature of the solvent was a major advantage, as the parts come out of the machine at the correct temperature, ready to be measured immediately. With other degreasers, the products come out of the machine too hot to handle, so cooling time needs to be factored in.

The lower temperature also means that the energy requirements – and therefore costs – of the system would be much lower, as the machine only needs to be heated to a constant temperature of 47 degrees. With the Aqueous system the chemical temperatures is 60°C and hot air drying around 90°C are needed.



**Bespoke Solvac TA machine installed into West Midlands Aerospace manufacturers facilities by Fraser Technologies.**

Along with the solvent, Fraser Technologies proposed a new innovative, bespoke machine, which offered increased automation and much better linkage. Full automation was included, meaning that operators simply needed to put the parts in at the start and remove them at the end for testing. Previously, the machines needed regular checks as well as handling throughout the process, which was much less efficient.

The technology of the machine provided a further improvement in efficiency, as it automatically recognises each part and assesses which process is required to clean every individual job. This not only offers immediate time and cost savings to the company, but it also future-proofs the machine, with an option for faster washes and increased loads when required.

The machine also incorporates a refrigerated cooling system, which minimise the escape of the solvent into the atmosphere. The low boiling point means that parts dry quickly, reducing solvent usage. Plus, as the new system is fully sealed, with automated filling, no requirement for extraction and no solvent on the parts at the end of the process, operators are never exposed to the chemistry. This makes the system much safer for both staff and the environment.

# The Results

The critical objective was to eliminate false failures during the CMM test process generated by residual contamination. With the final trial report confirming that this had been achieved the machine was approved for production, and since instalment in June 2019, the company has seen a 100% success rate for cleanliness for these components.

This has had a huge knock on effect, as CMM rework has dropped by 90%, dramatically improving the time taken on the process. This has reduced lead times and allowed for increased volume through the CMM, saving time and money. With increased automation, no need to add manual checks and much less maintenance, personnel have been freed up to focus on value-added work rather than problem solving. And, crucially, there are clear improvements in the cleanliness of the parts.

Chris Jeffery, manufacturing engineer at the company, led the project. He commented:

“The 100% cleanliness success rate is exactly what we were looking for. The process is significantly more efficient, which has in turn reduced our lead times and costs. This reduces the cost of the engine and the time spent on the process, which ultimately allows for increased innovation and guarantees the brand’s quality.

“We’ve worked with Fraser Technologies for many years, and I knew they would deliver on this challenge. They always provide a professional, hands-on approach, helping towards a solution at every stage. They offer an excellent level of support, with ongoing improvements, problem-solving workshops and they are always available when we need them.

“We can already see scope to further improve efficiencies in the future, and I look forward to continuing to work with them as part of our dedication to improvements in this area.”

Graham Fraser, managing director of Fraser Technologies added:

“We’re seeing an increasing number of businesses demanding higher cleaning precision in their components, with reductions in particle tolerances across a number of sectors. This combined with the demand for increased efficiencies, reduced emissions and minimised costs, means that superior cleaning technology – like the new generation of solvents – is critical to more and more businesses.

“Our solutions are always tailored to a customer’s exact demands, and we create bespoke options, as we did for this customer. We believe in a partnership approach, so we’re committed to providing solutions for our customers – working together for a common goal, to achieve a successful outcome.

“We are incredibly proud to work with this company, and add them to our corporate partnership portfolio. They are exceptionally professional, great to work with and while their standards can be challenging, coming up with a solution for them is very rewarding.”

**FRASER**  
TECHNOLOGIES

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