

“Since using Equator we have not made a single bad part and have reduced part production cost by 27%”

The quality of the products a company produces, and their assurance of that quality, can mean all the difference to successfully acquiring contracts. Maintaining that quality also significantly increases the chances of repeat business. High-Tech Engineering, a precision engineering company based in Dunstable, Bedfordshire, UK, has always focused on the quality of the parts it produces. Now with its latest addition, a Renishaw Equator gauging system, it is reaching 100% part inspection and zero scrap whilst halving the operator requirements and reducing part production costs by 27%.

Started in 1985 by Managing Director, Steve Tickner, High-Tech Engineering built a reputation in the motorsport industry for delivering high quality machined parts. The company has since moved into the aerospace sector and gained some key industry approvals, including becoming a preferred supplier to Rolls-Royce and BAE Systems.

Recently High-Tech won a contract to produce precision milled titanium parts for a large



Two parts produced by High-Tech engineering

aerospace customer. Due to the nature of the parts, High-Tech was instructed to carry out 100% part inspection. Steve Tickner explains, “We knew from the start that we would need to find an inspection method which could not only meet the



Renishaw Equator gauging system at High-Tech engineering

cycle time requirements for the part, but would be a cost effective solution for us as well. Relying on the CMM we already had wasn't going to be an option. We couldn't risk any bottlenecks. We knew that we would either need another CMM or something else which could give us the measuring capacity. That's what led us to the Renishaw Equator."

Equator™ gauging system acquisition

It was through a simple internet search that Steve came to learn of the Equator gauging system. After some research and following meetings with representatives from Renishaw, High-Tech was impressed with what the Equator gauging system could offer, and was particularly pleased with the overall price of the system.

Commenting on why High-Tech bought the Renishaw Equator gauging system, Steve says: "Space on our factory floor is at a premium. Within the space we set aside for this cell we had to include faster, more efficient technology. This meant that a co-ordinate measuring machine (CMM) with a temperature controlled environment was far too big to be practical. The Equator suited the space perfectly as it's a compact machine. The added bonus is the fact it is thermally insensitive and doesn't require any air supply, meaning we didn't need to spend additional time, money and effort putting in another temperature controlled room or extra piping."

High-Tech is currently using the Renishaw Equator gauging system to perform 100% inspection of a complex aerospace part. It works by comparing the manufactured parts against a matching master part, gauging all the features

in a single operation with an immediate pass/fail decision, along with a report of the component dimensions.

Comprehensive measurement in half the time of the existing CMM option

The Equator gauging system is used to gauge around 150 features including a number of bores, thicknesses and form measurements on the part with typical tolerances of $\pm 25 \mu\text{m}$. The Equator gauging system does this within 10 minutes and well within the production requirements, far less than the machining time. This is almost a 50% reduction in cycle time compared to running the program on High-Tech's CMMs.

Process control, run by the machine tool operator

Production at High-Tech runs 24 hours per day, 5 days per week and is split into 2 overlapping shifts. During this time Equator is used by a number of operators with varying skill sets. Previously, High-Tech Engineering would have relied on its CMMs, housed away from the machine tool in a temperature-controlled quality room. Using the CMM for the latest job would have involved two separate operators, firstly the operator machining the part and secondly the operator with the specialist skills to operate the CMM. By using an Equator instead, newly trained staff can use dimensions from a certified component, approved by the QC operators, to "zero" the Equator gauging system and set its accuracy for subsequent measurements. This has allowed the same operator who machined the part to measure the part, halving the operator time required.



The quality control room at High-Tech engineering



The factory floor at High-Tech engineering

Flexibility and future proofing

The Equator™ gauging system is fully programmable and can be used on multiple parts, meaning High-Tech Engineering can perform highly repeatable and rapid automated routines across numerous contracts resulting in significantly reduced labour costs.

Ease of use – push-button simplicity

Commenting on this, Mr Tickner states, “All of the operators can use Equator. It really is easy; just load the part and push the button. It completely simplifies the process and frees up manpower, which in turn helps to deliver ROI very rapidly for the cell.”

High-Tech has managed to reduce the cost of producing the aerospace part by 27% with the Equator gauging system being a factor in that. This has had a real impact on the competitiveness of this sort of production, allowing the company to make the same precision quality parts, whilst also delivering better value to its customers. It is through implementing these types of solutions and continually striving to improve their processes that High-Tech has been awarded 6 consecutive SC21 silver awards, which is unrivalled in the UK. This award recognises excellence within the aerospace and defence industry, for the quality of the products a company produces, as well as its ability to supply them. To receive a silver award a company must consistently achieve at least 95% for delivery performance and at least 99.5% on quality of parts to all of its customers.

Mr Tickner explains “Since we started using Equator we have not made a single bad part. The Equator is allowing the operators to operate complete process control. They all look at the Process Monitor screen, part of the Equator software, which lists all of the features being gauged. Next to the feature name there is a little bar which turns from green to amber to red as the size or location for each feature begins to drift. The operators know which tool on the machine is responsible for each feature and so can take corrective measures to occasionally tweak the process, to come back well within tolerance. As we carry out 100% inspection, it would be very hard to make a part wrong.” He continues, “We are also using the gauge data to trial different types of tool, to see which gives us the best level of efficiency – something which might save us more money in the future.”

Outlook

Following the success of this manufacturing cell, Mr Tickner plans to use the Equator gauging system as part of future cells he will be commissioning for jobs in the pipeline. He concludes: “When you find something which helps you make a perfect part every time, reduces manpower commitments, reduces overall costs and doesn’t cost a fortune itself, it’s a winning solution. All of the benefits are passed on to our customers who know they are getting the best quality at the best price”.

www.renishaw.com/gauging
www.high-tech-eng.co.uk
www.adsgroup.org.uk

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Renishaw is an established world leader in engineering technologies, with a strong history of innovation in product development and manufacturing. Since its formation in 1973, the company has supplied leading-edge products that increase process productivity, improve product quality and deliver cost-effective automation solutions.

A worldwide network of subsidiary companies and distributors provides exceptional service and support for its customers.

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- Fixturing for CMMs (co-ordinate measuring machines) and gauging systems
- Gauging systems for comparative measurement of machined parts
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- Probe systems and software for job set-up, tool setting and inspection on CNC machine tools
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