

“QI Analyst has given us many advantages since we fully deployed, continuous accuracy being the obvious, but we now have very timely information that is based upon a professional product that is helpful in customer retention and in new customer acquisition”.

***Rob Lockyear,
HDD Quality Engineer,
Rencol Tolerance Rings***

Less Stress Quality Assurance

by Pantek Ltd



Rencol Tolerance Rings is a specialist manufacturer producing high specification components for varied applications. The company wanted to automate its quality assurance processes and to gain additional insight into its product quality. Rencol chose Wonderware's QI Analyst in both trial and full role-out stages. Quality is now far easier to achieve and customers can be provided with full statistical information.

Rencol is the only company in the world solely focusing on the design and manufacture of Tolerance Rings that are individually developed for each customer

Company Overview

Rencol Tolerance Rings - Bristol, United Kingdom
Rencol Tolerance Rings is based in Bristol, UK, where they have an R&D Centre, European Technical Centre and Manufacturing Facility. They operate a specialist forming plant that produces tolerance rings with the optimum characteristics to meet individual customer requirements. The plant is unique to Rencol and is custom engineered to meet their specialised needs. Rencol supplies major customers in the Automotive, White Goods, Electric Motor and Hard Disk Drive industries and they have accreditation to major International quality standards and implement strict TQM systems throughout the company.

Today Rencol has Technical Centres in the UK, USA, Japan and Singapore, and manufacturing facilities in the UK, USA & Malaysia and is actively developing further global capabilities. These, together with the many customer approvals from globally recognised manufacturers who rely exclusively on Rencol, reinforce the unique status of the company world wide.

specific application; the products are produced in volume to extraordinary levels of accuracy and consistency. Tolerance Rings are radial spring fasteners that are press fitted between two mating components, generating a retention force that fixes those components together, whilst also providing additional functional requirements such as Torque Drive, Overload Protection, NVH (Harmonic Vibration) Performance and Differential Thermal Expansion. Thus mass produced components can be guaranteed to provide exact fit, and new operational advantages can be achieved by using this technology.

At the heart of the tolerance ring production process is repeatable quality. A tolerance ring is a high specification part that is usually a critical part of the final product. Product applications include key aspects of Automotive Steering Systems, Anti Theft Devices, Power Train Systems, Electric Motors, Hard Disk Drives, Gears, Pulleys and Impellers. It is therefore of absolute importance that high specifications are held throughout a production batch. Bristol, UK, based Rencol has been manufacturing Tolerance Rings for over 20 years and has been a user of QI Analyst for several years, initial use of the product being in the HDD (Hard Disk Drive) ring line. In this application

a tolerance ring is used on the read/write arm pivot. To make a tolerance ring strip material (usually carbon steel or stainless steel) has various corrugations (or waves) and flats formed into it, the formed material is then fed to special machinery that cuts off the required length, and forms it to a cylindrical shape. Tests are then conducted on the part to measure its characteristics, such as insertion force and "wave height" depending upon the application and the customer's quality specification.

Finished rings are measured by micrometers, vernier gauges, callipers and in some cases microscopically; the resulting data being entered by operators to the QI Analyst program. QI Analyst removes all the statistical computation aspects of the tasks, producing immediate results and also an historical archive. The quality process sits physically alongside the production machines, providing an efficient production process.

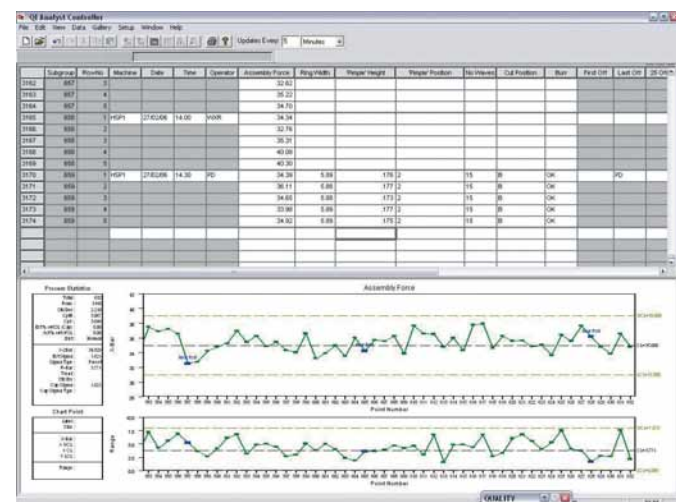
The success of the initial use of QI Analyst was the basis of a recent broader deployment to include the whole of Rencol's manufacturing quality processes; this has removed much repetitive data gathering and manual calculation throughout the production of all types of Tolerance Ring. All Tolerance Ring manufacture now being rapid, accurate and with less cost associated with testing. The system uses 21 workstations on the shop floor and MS SQL 2003 to hold all the generated data, and to produce reports for company and customer use. The quality data is reported in a clear and professional manner, this is of additional importance when presenting information to customers.

The decision of selecting QI Analyst for the complete manufacturing operation was made by a working group that considered three options; one being a in-house development based upon computerization of existing processes, another was to deploy MS Excel at the core using various statistical plug-ins and finally QI Analyst, based upon existing limited usage. The working group concluded that the in-house development would take too long, the Excel based system would have shortcomings (for example the inability to deal with a zero-data point) and recommended the full roll-out of QIA mainly owing to its rich features of useful and ready-to-go functionality. Pantek assisted in this decision by providing a list of other QIA users that were prepared to share their experience with Rencol. In addition Pantek's SPlan support is used by the

company to ensure that the product and its application are optimised and up to date.

In use by Rencol QI Analyst provides not only full SPC but also provides a data repository for many other dimensions that are measured during the quality process. Each Tolerance Ring has a dimensioned drawing; these measurements are matched to data fields within QI Analyst. Thus QIA operates in recording and SPC modes, providing a single system for these differing requirements.

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QI Analyst display

continuous accuracy being the obvious, but we now have very timely information that is based upon a professional product that is helpful in customer retention and in new customer acquisition".

As with the introduction of all software systems it was critical that machine operators were trained and also accepted use of the product. Training was undertaken using in-house resource through three levels. In use QI Analyst was found to be intuitive and operators, regardless of any previous computer experience, quickly accepted that the new system was far easier than the old manual method.

Rencol is of course an ISO 9001 company and also carries numerous quality approvals for the Automotive (such as TS16494) and other industries. Given the nature of Rencol's business, SPC is to be found at the heart of the company's culture. QI Analyst is a key component of quality certification and is part of annual re-validation audits. The QI Analyst programme at Rencol is on-going, intelligent gauging with electronic



Ring production with quality control workstation

communication interfaces is now being evaluated and will be integrated to QIA as the business case is developed. This will allow faster quality procedures with further reduced risk of error.

When pressed about Rencol's use of QI Analyst, Rob indicated that he felt that all the features in the

product were, or would be, used by Rencol in their constant efforts to ensure continuous quality. Finally Rob said, "QI Analyst removes the stress from Quality Assurance".

*This document was realized thanks to the support of:
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