

## Less Stress Quality Assurance

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™ software in both trial and full role-out stages, Quality is now far easier to achieve and customers can be provided with full statistical information.

*"QI Analyst software removes the stress from Quality Assurance".*

*Rob Lockyear  
Rencol Tolerance Rings*

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 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

### Quality in all applications...

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.

Rencol has been manufacturing Tolerance Rings in Bristol, UK, for over 20 years and has been a user of QI Analyst software 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.



**Tolerance Ring production**

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.

### Measurement and Statistics...

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 software program. QI Analyst software 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.

*Rob Lockyear, HDD Quality Engineer, says, "QI Analyst software 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".*

The success of the initial use of QIA 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 matter, this is of additional importance when presenting information to customers.

#### Options...

The decision of selecting QI Analyst software 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

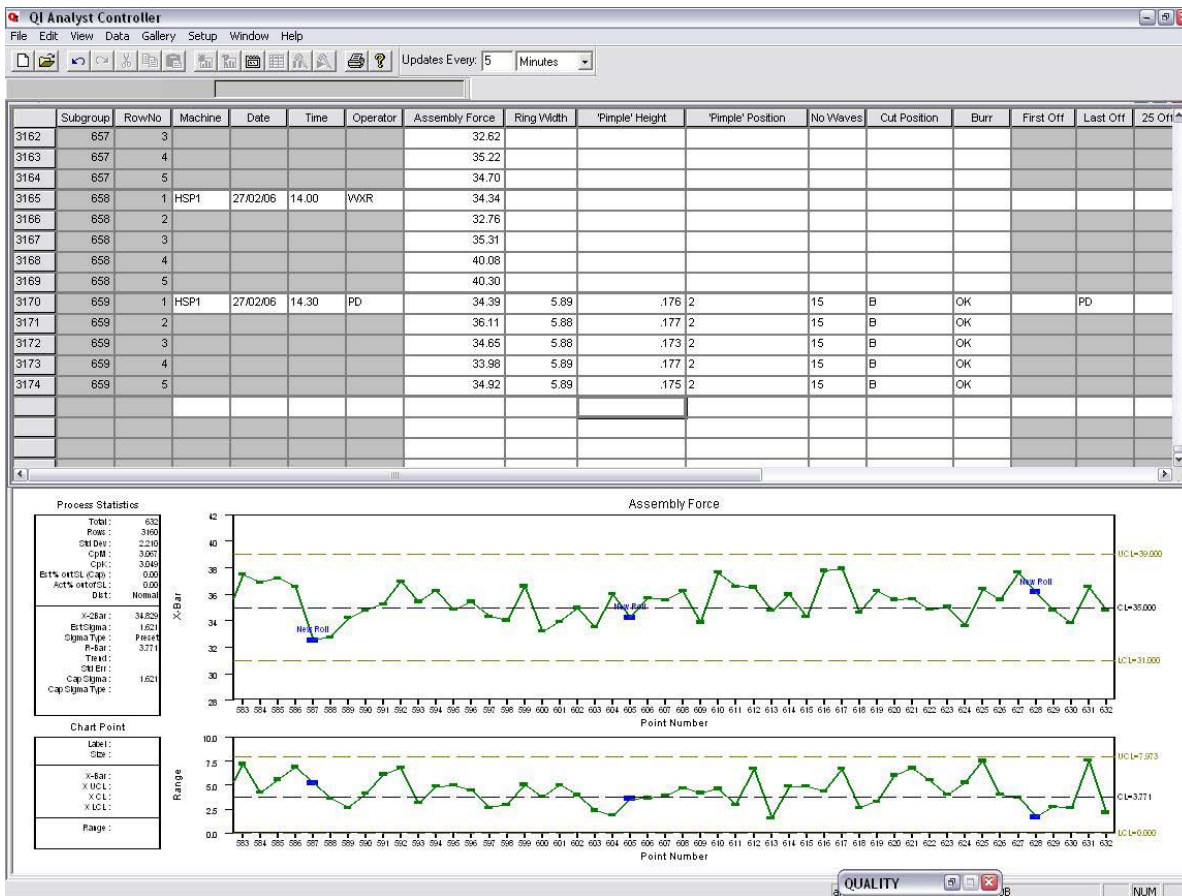
shortcomings (for example the inability to deal with a zero-data point) and recommended the full roll-out of QIA mainly owing to its rich features of useful and ready-to-go functionality. Wonderware United Kingdom assisted in this decision by providing a list of other QIAnalyst users that were prepared to share their experience with Rencol. In addition Wonderware United Kingdom'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 software 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 QI Analyst software operates in recording and SPC modes, providing a single system for these differing requirements.

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**Tolerance Rings - high volume, consistent quality**





**QI Analyst display**

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 software 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.

**Continuous Improvement...**

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 software is a key component of quality certification and is part of annual re-validation audits.

The QI Analyst software programme at Rencol is on-going, intelligent gauging with electronic 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 software removes the stress from

Quality Assurance".

**Appendix...**

The use of QI Analyst software continues at Rencol. A new and additional method of obtaining value from the investment has been realised. This is to run all off-line statistical calculations on QI Analyst software in an office based utility. This was not the case at the time of the success story as this was then done through Excel and other tools. QI Analyst software has been found to be far more effective in undertaking this task and provides high level company manufacturing information and is a key element of their continuous improvement programme.

*Wonderware UK wishes to thank the following company for its valued contribution to this success story...*

**Rencol Tolerance Rings**

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