



# revving up for a change



With the American, German, French, Italian and Japanese vehicle manufacturers (VMs) behind it, ISO/TS 16949:2002 (2nd edition), stands to become the global automotive QMS of the future.

Dr David Scrimshire, a director of TEC Transnational Ltd, takes us through the revised standard which aligns worldwide automotive QMS requirements and looks set to shake-up the whole industry

**T**itled 'Quality management systems - particular requirements for the application of ISO 9001:2000 for automotive production and relevant service part organisations', the technical specification of ISO/TS 16949:2000 (2nd edition), harmonises the separate requirements previously contained in QS-9000 (3rd edition) with the European automotive quality standards into a single document aligned with ISO 9001:2000.

An accredited certification process is now established. The customer-specific requirements of the participating VMs will be assessed as part of the ISO/TS 16949:2002 assessment audit. Each company's certification will list the customers whose requirements that company has met. This article:

- reviews the development and roll-out of ISO/TS 16949:2002 (2nd edition)
- identifies the new and potentially contentious requirements
- explains the challenges and timings of

the transition process

- analyses the potential benefits to the VMs and their suppliers

## United we stand

Until recently, VMs in different countries had to use their own national standards to control their supply chain and the quality of the components they produced. Of these, QS-9000 is the most recognised, with some 23,000 sites (800 in the UK) with third-party certifications (according to the ASQ, QS-9000 worldwide certified company directory website).

It was a logical step for all interested parties to work together to produce a truly universal set of automotive quality system requirements. The necessary work was undertaken by the international automotive task force (IATF) and resulted in the publication of the first edition of ISO/TS 16949 in 1999 under the auspices of ISO technical committee 176. IATF is an ad hoc group that includes representatives of

the big three (General Motors, Ford Motors and DaimlerChrysler), as well as BMW, Fiat, PSA Peugeot-Citroen, Renault SA, Volkswagen and the national trade associations from the US, Germany, France, Italy and the UK.

Significant differences between QS-9000 and VDA-6.1 in particular had to be resolved. First, QS-9000 includes ISO 9001:1994 in its entirety to which automotive supplementary requirements are added. VDA-6.1 in contrast uses ISO 9004 as its basis. Consequently, VDA-6.1 contains concepts not found in either ISO 9001:1994 or QS-9000 (3rd edition) such as employee satisfaction, marketing process and cost analysis for new products. Second, QS-9000 is assessed using the pass/fail (conforms/does not conform) approach while VDA-6.1 adopts a percentage conformance method.

The work of IATF continued with the need to align the additional automotive requirements with ISO 9001:2000 and further



rationalise and improve on the first edition. The committee draft of the second edition of ISO/TS 16949 was completed in July 2001 with the participation of the Japan Automotive Manufacturers Association (JAMA). The official ISO final draft was subsequently published in December 2001 as ISO/DTS 16949. Members of TC 176 (the ISO technical committee) voted with their approval, although significantly both the US and Germany voted against it. Their concerns were later accommodated in revisions. ISO/TS 16949:2002 became available in April 2002.

### What's new?

Although the second edition was intended to be a simple realignment of the automotive requirements with ISO 9001:2000, it is clear that IATF have taken the opportunity to clarify and reword sub-clauses and remove all of the QS-9000 and first edition 'how-to-do' lists - including the prescriptiveness of the business plan format. In fact a business plan is no longer an explicit requirement, although it is referenced under quality objectives.

Other examples where ISO/TS 16949:2002 has removed explicitly stated requirements, include:

- job instruction contents
- establishment of systems to support 100 per cent 'on time' deliveries with corrective actions
- the development, evaluation and monitoring of lead time requirements
- a system to monitor performance to customer delivery requirements with corrective actions
- records of supplier-responsible premium freight
- adherence to up-to-date customer-specified transportation mode, routings and containers
- requirements concerned with electronic communication and a shipment notification system

Perhaps the most controversial new requirement is supplier QMS development, which mandates that 'unless otherwise specified by the customer, suppliers to the organisation shall be third-party registered to ISO 9001:2000 by an accredited third-

party certification body'. This provides individual VMs with the discretion to set the QMS requirements while making clear that ISO 9001:2000 certification is the likely customer requirement. As such, ISO/TS 16949:2002 does not automatically mandate certification to ISO 9001:2000. So, if a customer specifies an alternative approach in its contractual or customer-specific requirements, ISO/TS 16949:2002 will not require the organisation to have its suppliers certificated to ISO 9001:2000. It is also feasible that the organisation could approach its VM customer to have selected suppliers exempted from this certification requirement for justifiable reasons.

The previous difficulty with 'pre-launch planning' (eg advanced product quality planning and project management) has been resolved using ISO 9001:2000 clause 7.1 and a supplemental note. Nonetheless, the need to comply with customer requirements and references to their technical specification for the planning of product realisation remains, as mandated, in the planning of product realisation. Companies supplying several customers will have to conform to the multifarious product and process approval procedures recognised by the individual customers. For example the big three suppliers (and their sub-tiers) will continue to use the third edition of the production part approval process manual and all of the current editions of the other reference manuals.

The QS-9000 section 2 (customer-specific requirements) has been replaced by separate customer publications. Where present they will, of course, be subject to third-party scrutiny.

### Shift into fourth

Clearly, the second edition is a very different document to the first edition. First, there is the need to move to the fundamentally new 'process model' philosophy and PDCA methodology used by ISO 9001:2000 which will require a quantum shift in both approach and documentation style. The direct involvement of top management is increased in areas such as the definition of the organisations' quality pol-

icy and quality objectives - including top management objectives - and the subsequent deployment through employee motivation and empowerment, and the analysis and use of data.

Top management should also provide the leadership for continual improvement by ensuring that a process is defined for continual improvement of the organisation, that manufacturing process improvement is focused on control and reduction in product characteristics and processes, and that supplier QMS development actually takes place. Other areas requiring attention include customer satisfaction, competence awareness and training, and the monitoring and measurement of processes.

Second, the sheer number and broad implications of the additions and changes clearly indicate that a great deal of effort will be required to migrate from a QS-9000 (3rd edition) based quality assurance system to a QMS that can be registered to ISO/TS 16949:2002. Central to the new global philosophy is the need to accommodate differing customer preferences for pre-launch planning that may need to embrace advanced product quality planning and project management as separate quality plans.

Requirements for stringent control of manufacturing operations continue over from QS-9000 and now add preventive and predictive maintenance, management of production tooling and supplier monitoring. A process to address employee motivation and empowerment and a 'multidisciplinary approach' to plant, facility and equipment planning will certainly demand objective evidence of full implementation, especially if they have been recently introduced.

Internal auditing has been considerably strengthened with the mandatory addition of the manufacturing process audit, the use of specific checklists and internal auditor qualification. In all, there are some 80 detailed differences between ISO/TS 16949:2002 and QS-9000 (3rd edition) plus minor alterations and rewording to facilitate the alignment of the automotive-specific requirements with the ISO 9001:2000 clauses. Third, under IATF





Figure 1. Lifetimes of the automotive and ISO standards

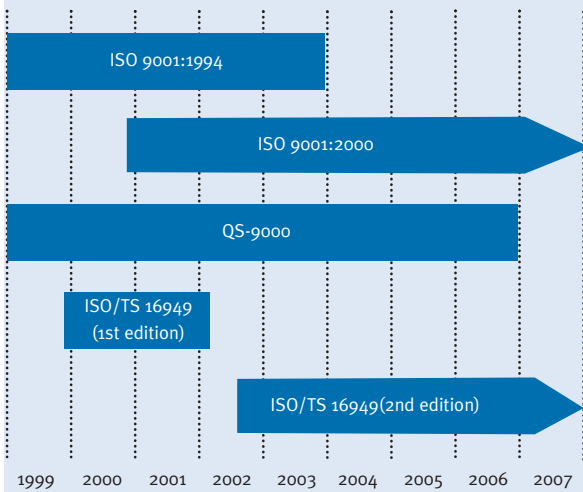
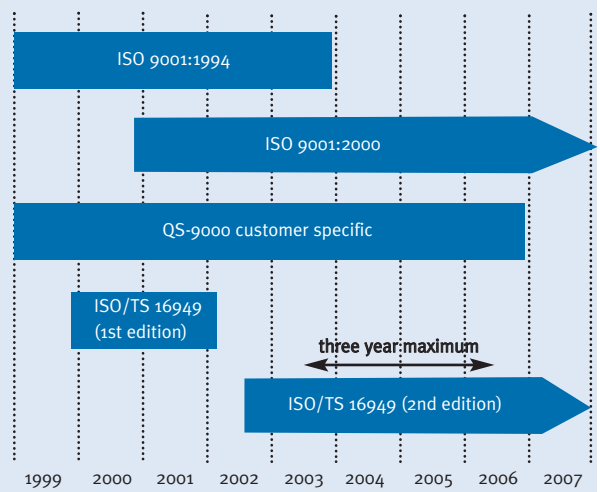


Figure 2. Relative lifetimes of QS-9000 (3rd edition) and ISO/TS 16949



rules it is mandatory to have a minimum of 12 months' records of 'operational performance trends' and internal audit and management review planning as well as results from the previous 12 months. In addition a list of qualified internal auditors and a list of customers/customer-specific requirements is necessary. There must also be evidence of customer complaints management. Finally, all nonconformities identified during the assessment process must be cleared by the organisation and verified by the certification body audit team prior to certification.

### o-6o in how long?

Don't panic! ISO/TS 16949:2002 will exist as an alternative to QS-9000 (3rd edition) and the other European documents for the present. The remaining lifetimes are shown schematically in figure 1.

ISO 9001:1994, on which QS-9000 is based, becomes obsolete on 15 December 2003. The rumour that QS-9000 may stay in force for US suppliers after the transition period to ISO 9001:2000, and ISO/TS 16949:2002 in December 2003, was recently confirmed by a General Motors representative. The big three's umbrella organisation, supplier quality requirements task force, has reached an agreement with ISO to permit the use of ISO 9001:1994 contained within QS-9000 (3rd edition) until 14 December 2006. The reason for this apparent delay in the transition process

is to prevent a bottleneck of suppliers going for the transfer audit and to allow sufficient time for the upgrade to be implemented in a value-added manner.

Certificates for QS-9000 may require amendment to be valid past 15 December 2003. New certificates for QS-9000 can continue to be issued throughout the extended period, but must be transferred over to ISO/TS 16949:2002 (2nd edition), by 14 December 2006.

Organisations may still be certificated to ISO/TS 16949:1999 (1st edition), until December 2003 although this option would appear to have little attraction. From that date all new certifications must be to ISO/TS 16949:2002 (2nd edition). Companies already certificated to ISO/TS 16949:1999 will have until December 2003 to upgrade to ISO/TS 16949:2002. The relative lifetimes of QS-9000 (3rd edition) and ISO/TS 16949 (1st and 2nd editions) are shown in figure 2.

While the position of VMs remains fluid, sources expect that many will require their suppliers to migrate to ISO/TS 16949:2002 (2nd edition) sooner rather than later. The big three are expected to require ISO/TS 16949:2002 (2nd edition) certification for all tier-1 suppliers by 1 December 2003. Sub-tier suppliers are expected to be allowed the option of maintaining their current QS-9000 certifications until the 2006 deadline.

Ford's own quality system standard, Q1 2002, requires third-party certification to either QS-9000 or ISO/TS 16949 for suppliers of production and service parts. In addition, Q1 2002 mandates ISO 14001:1996 EMSs - specification with guidance for use augmented by a biannual assessment by Ford's STAs to ensure supplier conformance with Q1 2002.

It is likely that other VMs will make their individual intentions clear to suppliers in due course. For example, Nissan and Renault are now mandating ISO/TS 16949 as part of their alliance new product quality planning process. Clearly ISO/TS 16949:2002 is here to stay and QS-9000 and the 'European catalogues' have largely run their course. There are no plans to update QS-9000, VDA 6.1, EAQF or AVSQ. QS-9000 will definitely cease to exist on 15 December 2006.

### Ensure a smooth ride

The publication of ISO/TS 16949:2002 will further increase the pressure on all companies involved with the automotive industry to upgrade from ISO 9001:1994 in order to meet the basic expectations of the VMs. Apart from IATF members, UK-based VMs and manufacturers such as GKN, Honda UK, Jaguar Cars, Mobil Oil, Nissan Motor Manufacturing UK, Rolls-Royce Motor Cars and Bentley Motor Cars have indicated their support for ISO/TS 16949:2002. It is likely that more and



**'ISO/TS 16949:2002 is now the single global scheme which will quickly eliminate disparities between the various national documents. Third-party certification in contrast to "conformance" will become the norm.'**

more tier-1 suppliers will mandate third-party certification thereby cascading both ISO/TS 16949:2002 (and ISO 9001:2000) down the supply chain.

From the viewpoint of the global VMs the main advantage is the fact that all of their suppliers will have QMSs complying with ISO/TS 16949:2002, with the attendant advantages. Their suppliers' systems will also be subject to a stringent assessment/registration/surveillance process by a disinterested certification body. Less cost will need to be expended by the VMs on supplier QA, and the inevitable adversarial situation traditionally associated with customer audits will be eliminated.

The use of ISO/TS 16949:2002 will impose a 'common language' in quality system requirements. The baseline language of ISO/TS 16949:2002 is English, and all translations will be made from English into other languages - thereby minimising the scope for error. Every attempt has been made to ensure that ISO/TS 16949:2002 is 'linguistically friendly' so that terms in one language will have the same meaning in another language.

For suppliers opting for ISO/TS 16949:2002, the most obvious advantage will be that their third-party registration will satisfy the demands of all US, European and Japanese-based VMs and their tier-1 supplier companies. This will obviate the need for multiple customer audits, pulling them in different directions.

#### And the survey said...


An automotive industry action group (AIAG) survey, conducted in March 2001 revealed that of the 229 respondents, 84 per cent felt that third-party certification provided high or medium value to their

organisations. All of the respondents were QS-9000 (3rd edition) certified.

In addition, IATF members have identified the following ISO/TS 16949:2002 benefits:

- efficiency, effectiveness and productivity improvements due to the emphasis on process auditing rather than documentation
- reduction in frequency of second-party audits, since most VMs recognise the assurance of third-party registration
- provision of global sourcing advantages/recognition as a result of ISO/TS 16949:2002 being an ISO publication
- inevitable 'shake-out' of marginal suppliers that will not be able to achieve third-party registration

ISO/TS 16949:2002 is now the single global scheme which will quickly eliminate disparities between the various national documents. Third-party certification in contrast to 'conformance' will become the norm. Consequently, a VM building vehicles in one country but procuring products from another country will have the same level of confidence as would be obtained had the product been procured from the home country.

This, of course, is something of a double-edged sword which is bound to result in further global sourcing especially from countries with inherently lower overheads, labour and material costs. Early adoption of ISO/TS 16949:2002 should lessen the threat. Implementation of standardised processes and 'core tools' to support the enhanced QMS will lead to continual improvement in performance and reductions in variation. The result will inevitably be a boost in competitive advantage and an improvement to the bottom line 

#### The German, French and Italian VMs equivalent sector schemes are:

##### VDA 6.1

Qualitätsmanagement in der Automobilindustrie - QM Systemaudit 3 vollständig überarbeitete Auflage 1996/1, July 1996

##### EAQF '94

Evaluation aptitude Qualité Fournisseur, 1994 edition plus QS-9000 appendix to EAQF March 1997 edition

##### AVSQ '94

ANFIA Valutazione Sistemi Qualità, edizione 3, Febbraio 1995 plus Addendum QS 9000 all AVSQ, edizione Marzo 1997



Dr David Scrimshire is a director of TEC Transnational Ltd. He is a chartered engineer with a degree in production engineering and a PhD in computer modelling. He has published over 100 technical articles dealing with manufacturing and quality systems and is a frequent speaker on automotive and aerospace quality and manufacturing system matters at international conferences. He was one of the first Europeans to pass the automotive sector specific qualification process for QS-9000 assessments authorised by the supplier quality requirements task force in 1994. The Institute of Cast Metal Engineers awarded Dr Scrimshire the Oliver Stubbs Medal in 2000 for his service to the UK foundry industry.

TEC Transnational Ltd provides training and system implementation for automotive VMs and suppliers. To date it has guided over 180 companies through to successful QS-9000 and ISO/TS 16949 registration. It has also been responsible for taking over 550 organisations through to ISO 9001 and ISO 14001 certification, with a client list including many of the leading UK and US VMs and supplier organisations. It can be contacted on t: 01926 851403, e: isots16949@talk21.com or visit [www.tec-transnat.com](http://www.tec-transnat.com)