Quality System Requirements

QS-9000

First Edition Issued August, 1994
Second Edition, February, 1995
Third Edition, March, 1998 • Second Printing, June, 1998 • Third Printing, October, 1998

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The February, 1995 edition is obsolete January 1, 1999 unless otherwise notified by customers (see Foreword to Third Edition).

The QS-9000 Third Edition, Second and Third Printings, incorporate several minor format corrections and updated customer specific information (see Appendix F).

The Second Edition, Fourth Printing deleted the Chrysler, Ford and General Motors logos from the front cover and internal pages. References to **APQP, SPC, MSA, PPAP, FMEA, QSA** refer to those manuals published jointly by Chrysler, Ford and General Motors.

Further copies are obtainable from AIAG at 01-248-358-3003

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In Europe contact Carwin Continuous 44-1708-861333

FOREWORD TO THIRD EDITION

Nearly 500,000 copies of QS-9000 in five languages are distributed in at least 63 countries. Chrysler, General Motors and certain Ford locations worldwide require QS-9000 third party registration for suppliers. Supplier survey results indicate the benefits of QS-9000 registration include:

- improved quality, e.g. reduced PPM from pre-registration levels, less scrap and rework
- improved efficiency
- improved delivery
- improved company morale
- improved internal and external communications

Certification bodies/registrars are required to promptly report QS-9000 registrations to ASQ, formerly ASQC, (see below), the administrator of the sanctioned QS-9000 Worldwide Registered Company Database. A quarterly directory is available, and the information can be accessed for a fee on the ASQ Internet Web Page (http://www.asq.org/9000). This database also lists the recognized accreditation and QS-9000 qualified certification body/registrar offices.

Changes made in the Third Edition are summarized in the revised QS-9000 Appendix F, Change Summary. A two-column workbook, showing the QS-9000 Second Edition text in the left column, and the Third Edition text changes in the right column, is available from AIAG and Carwin Continuous (see below).

All previous editions of the International Automotive Sector Group (IASG) Sanctioned QS-9000 Interpretations will be obsolete at the same time as the QS-9000 Second Edition becomes obsolete. These Sanctioned Interpretations have been incorporated as appropriate into the Third Edition. The Sanctioned Interpretations were intended to provide clarification regarding field related questions in the launch of QS-9000**.** Some interpretations, which provided clarification, are not needed after migration to the QS-9000 Third Edition is complete. Any IASG Sanctioned QS-9000 Interpretations which may be issued subsequent to the release of the Third Edition and which specify applicability to QS-9000 Third Edition are binding for QS-9000 registration/compliance stakeholders.

The QS-9000 Third Edition may be used immediately for QS-9000 compliance/registration efforts. The Second Edition may continue to be used until January 1, 1999 at which time it becomes obsolete, unless otherwise notified by the customer.

Further harmonization discussions with the French, German and Italian OEMs are continuing. Agreement was reached in 1996 to revise the current manuals to provide reciprocal recognition for internal audit (QS-9000 element 4.17) and subcontractor development (QS-9000 clause 4.6.2.1). Thus it is acceptable for a supplier to use the revised AVSQ, EAQF or VDA6 manuals for internal auditing and subcontractor development to satisfy QS-9000 third-party registration requirements regarding elements 4.17 and 4.6.2 (See Appendix I). Reciprocal recognition does **not** extend further, e.g. registration to AVSQ, EAQF or VDA6 is <u>not equivalent</u> to QS-9000 registration. Additional information regarding future quality system requirement developments will be communicated as appropriate.

Acknowledgments for this effort are due to: the numerous European OEM representatives, Automotive Industry Action Group Truck Advisory Group members, Chrysler, Ford, General Motors and supplier company reviewers, and the International Auto Sector Group members. Special acknowledgment is given to Tripp Martin, the ASQ Automotive Division Task Force Liaison, for assistance in preparing the Third Edition. Thanks are also given to these organizations which have supported Chrysler, Ford, and General Motors in the QS-9000 launch worldwide:

Task Force administrative support, distribution of
manuals and sanctioned training delivery ..... Automotive Industry Action Group (AIAG)
01-248-358-3003

QS-9000/QSA Overview Training
APQP Overview Training
PPAP/FMEA Overview Training
QS-9000 Internal Auditing
Tooling and Equipment Supplement Overview Training
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Distribution of manuals (Europe) ..... Carwin Continuous
44-1708-861333

Distribution of manuals (Australia) ..... Federal Automotive Parts Manufacturers (FAPM)
Fax: 61-6-257-4651

Worldwide QS-9000 Certified Company Database ..... American Society for Quality (ASQ)
01-414-272-8575 (North America Only: 1-800-248-1946)

March, 1998

FOREWORD TO SECOND EDITION

Since the North American mailing of Quality System Requirements (QS-9000) to suppliers last August, the response worldwide has been overwhelming and positive. Agreements have been reached with numerous accreditation bodies, and their accredited third party certification bodies/registrars, to conduct QS-9000 registrations to support our needs. Some OEMs have announced third party QS-9000 registration requirements for suppliers. This has created significant demand. We have responded with increased capacity to:

a) Deliver the sanctioned QS-9000/QSA supplier and certification body/registrar training, and

b) Handle requests for additional manuals in a timely manner.

The worldwide demand for QS-9000 has created the need for this second edition, which becomes effective immediately.

Input received from those implementing QS-9000 to date has been incorporated into this edition to clarify the intent of the requirements, or to bring the manual up-to-date. In particular, revisions recommended by the Companies' European affiliates have been included to facilitate QS-9000 implementation throughout Europe. A change summary has been provided in Appendix F, and is available from AIAG (Appendix F and changed pages). The August, 1994 edition of QS-9000 can be used until January, 1996, at which time it becomes obsolete unless updated with Appendix F and changed pages. Refer also to the specific information that has been communicated to suppliers from individual customers.

This edition of QS-9000 is the initial distribution on a worldwide basis. Therefore, many suppliers will be viewing this document for the first time. Local training will be established by the OEM customers to facilitate understanding and implementation. Additional information can be obtained from your customer's supplier quality organization, the OEM-recognized accreditation bodies (current listing of QS-9000 qualified registrars), or AIAG in the U.S. (training class schedules and additional manuals).

February, 1995

FOREWORD TO FIRST EDITION

Quality System Requirements QS-9000 was developed by the Chrysler/Ford/General Motors Supplier Quality Requirements Task Force. Previously, each company developed their own expectations for supplier quality systems and the corresponding assessment documents.

In 1988, the Purchasing and Supply Vice Presidents of these companies chartered the Task Force to standardize reference manuals, reporting formats, and technical nomenclature. Since then, the Task Force has published five standardized manuals. These have been well received by the supplier community and their success served to encourage additional efforts.

In December, 1992, these Vice Presidents directed the Task Force to harmonize the fundamental supplier quality systems manuals and assessment tools. It was understood that there will continue to be company-specific, division-specific, and commodity-specific requirements that each company will handle separately.

Accordingly, acknowledgments are due to: the leadership of Thomas T. Stallkamp at Chrysler, Norman F. Ehlers at Ford, and G. Richard Wagoner, Jr. at General Motors; the primary authors of the document, Russell Jacobs (Chrysler), Radley Smith (Ford), and Dan Reid (General Motors); the guidance of Task Force coordinator Bruce Pince (Sandy Corporation); the Automotive Industry Action Group (AIAG) for assistance with document distribution and training coordination; the Task Force's Supplier Advisory Council; the AIAG Truck Advisory Group (See Truck Manufacturers-Specific Requirements), and the International Organization for Standardization (ISO).

For the Truck Manufacturers, special acknowledgment is due to the leadership and continuous support of the executives of Freightliner, Mack Trucks, Navistar International, PACCAR and Volvo GM Heavy Truck.

The Task Force is confident that **QS-9000**, implemented in the spirit of continuous improvement, will enhance quality systems while eliminating redundant requirements and thus reducing costs. In that same spirit, the Task Force encourages suppliers to suggest how the document and its implementation can be improved.

August, 1994

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Appendices

Introduction

Goal

The goal for **Quality System Requirements QS-9000** is the development of fundamental quality systems that provide for continuous improvement, emphasizing defect prevention and the reduction of variation and waste in the supply chain.

Purpose

QS-9000 defines the fundamental quality system expectations of Chrysler, Ford, General Motors, Truck Manufacturers and other subscribing companies for internal and external suppliers of production and service parts and materials. These companies are committed to working with suppliers to ensure customer satisfaction beginning with conformance to quality requirements, and continuing with reduction of variation and waste to benefit the final customer, the supply base, and themselves.

Approach

QS-9000 is a harmonization of Chrysler's **Supplier Quality Assurance Manual**, Ford's **Q-101 Quality System Standard**, and General Motors' NAO **Targets for Excellence**, with input from the Truck Manufacturers. ISO 9001:1994 Section 4 has been adopted as the foundation for **QS-9000** and is printed in Section I in *italic* type. Interpretations and supplemental quality system requirements have been harmonized and are printed in normal type. While other companies may adopt this document, Chrysler, Ford, and General Motors retain full control over the content except for ISO 9001:1994, of which copyright remains with the International Organization for Standardization.

The word "shall" indicates mandatory requirements. The word "should" indicates a mandatory requirement with some flexibility allowed in compliance methodology. Suppliers choosing other approaches to satisfy a "should" must be able to show that their approach meets the intent of **QS-9000**. All **QS-9000** requirements shall be addressed in the quality system documentation, but not necessarily by individual procedures.

Where "typical", "example", or "e.g." are used, any suggestions given are for guidance only.

The references to "this International Standard" in the ISO text of 4.1.2.3, 4.1.3, 4.2.1, 4.2.2, 4.5.1, and Note 17 (4.11.1) shall be understood for the purposes of **QS-9000** to refer to **QS-9000** requirements, and not just ISO 9001 or ISO 9002 requirements.

Paragraphs marked **"NOTE"** are for guidance in understanding or clarifying the associated requirement. The word, "should," appearing in a **NOTE** is for guidance only.

The Glossary contains information which should be used for purposes of compliance/registration to **QS-9000**. Where inconsistent terminology exists between **QS-9000** and ISO 8402 (or other similar documents, e.g., ISO A-3), **QS-9000** takes precedence for **QS-9000** registration.

Applicability

QS-9000 applies to all internal and external supplier sites of: a) production materials, b) production or service parts, or c) heat treating, painting, plating or other finishing services directly to OEM customers subscribing to this document.

QS-9000 applies to providers of: 1) semiconductors in conjunction with the **Semiconductor Supplement** issued by Chrysler, Ford and Delco Electronics; 2) tooling and equipment in conjunction with the **Tooling and Equipment** (TE) **Supplement** issued by Chrysler, Ford and General Motors. Availability of third party registration to the **TE Supplement** will be announced by Chrysler, Ford and/or General Motors as appropriate.

"Site" (see Glossary) is defined as a location at which value-added production processes occur (see Glossary). Remote locations, e.g. engineering, purchasing, internal off-site warehouses, shall be audited as they support a site. Remote locations cannot obtain independent **QS-9000** registration. Remote locations shall be included in the initial audit and then be included in the normal surveillance plan and at a regular frequency. Remote locations where design function is performed shall undergo surveillance audits at least once within each consecutive 12-month period.

Service parts and materials applicability does not include aftermarket (see Glossary) parts or suppliers.

If in doubt regarding **QS-9000** applicability, contact your customer.

Only those suppliers meeting the "Applicability" definition are required to achieve compliance/registration. Any "site" may elect to pursue third

party registration; however, such "sites" shall have demonstrated capability to comply with all **QS-9000** requirements as evidenced by records (see 4.16) except for customer approval of the **PPAP** Part Submission Warrant. Only 4.19: Servicing (and 4.4: Design Control for ISO 9002) may be determined as not applicable by the certification body/registrar. Commercial/independent laboratory facilities cannot be registered to **QS-9000**.

This document supersedes all editions of Chrysler's **Supplier Quality Assurance Manual,** Ford's **Q-101 Quality System Standard,** General Motors' NAO **Targets for Excellence,** General Motors' Europe **General Quality Standard for Purchased Materials** and the Truck Manufacturers' quality system manuals dated prior to 1995.

Implementation

Chrysler, Ford, General Motors, the Truck Manufacturers and the other subscribing companies require that suppliers establish, document, and implement effective quality systems based on **QS-9000** in accordance with timing requirements established by their customers. All requirements of **QS-9000** are to be incorporated in the supplier's quality system and described in the supplier's quality manual (see Glossary). **QS-9000** is an input document for development of a quality manual. See the Quality System Documentation Progression on page 6 for an illustration of the typical levels of documentation.

Conformance to **QS-9000** will be evaluated using the process described in Appendix A. Each customer will continue to develop unique supplier ratings.

Third party registration to **QS-9000** will be accepted and will be required by some customers (refer to Section II: Customer-Specific Requirements). Verification of conformance to ISO 9001 (or ISO 9002 for suppliers that are not responsible for the design of any product supplied to any customer subscribing to this document) is a necessary condition for registration to **QS-9000**. Registration to ISO 9001, however, may not be sufficient for the companies using **QS-9000**, since this document contains additional requirements for these companies. Subcontractor third party registration to **QS-9000** is not required by Chrysler, Ford or General Motors at this time.

Suppliers and subcontractors shall deploy **QS-9000** as appropriate. Any company may require **QS-9000** registration of its suppliers, regardless of the company's position in the supply chain, e.g. Tier 2 and below.

The third party registration scope must include all products and services being supplied to one or more of the companies subscribing to this document, unless specifically waived by the customer.

The term **QS-9000** is a copyright protected property of Chrysler, Ford and General Motors. Only those third party certification bodies/ registrars qualified for **QS-9000** by a Chrysler, Ford and General Motors recognized accreditation body are permitted to issue a registration certificate with the term **QS-9000**.

The related **QS-9000** manuals are available from AIAG, Carwin Continuous or FAPM (see Foreword for phone numbers). The related manuals (with latest edition number and date at time of publication) are shown below. For document control purposes, use the edition numbers/dates. "Printing dates" do not represent revisions to these documents except for **PPAP** Second Edition.

Quality System Assessment
-Second Edition, dated March 1998

Measurement Systems Analysis Reference Manual
-Second Edition, February 1995

Statistical Process Control Reference Manual
-First Edition, 1992

Potential Failure Mode and Effect Analysis Reference Manual
-Second Edition, February 1995

Production Part Approval Process
-Second Edition, Second Printing, July 1995

Advanced Product Quality Planning and Control Plan Reference Manual
-First Edition, June 1994

Semiconductor Supplement
-First Edition, April, 1995

AEC-A100: QSA Semiconductor Edition
-First Edition, April 1995

Tooling and Equipment Supplement
-First Edition, July 1996
-Hotline in U.S.: 1-800-444-2810
-Hotline outside U.S.: 01-248-358-3003
-TE Training Information: 01-248-799-4228

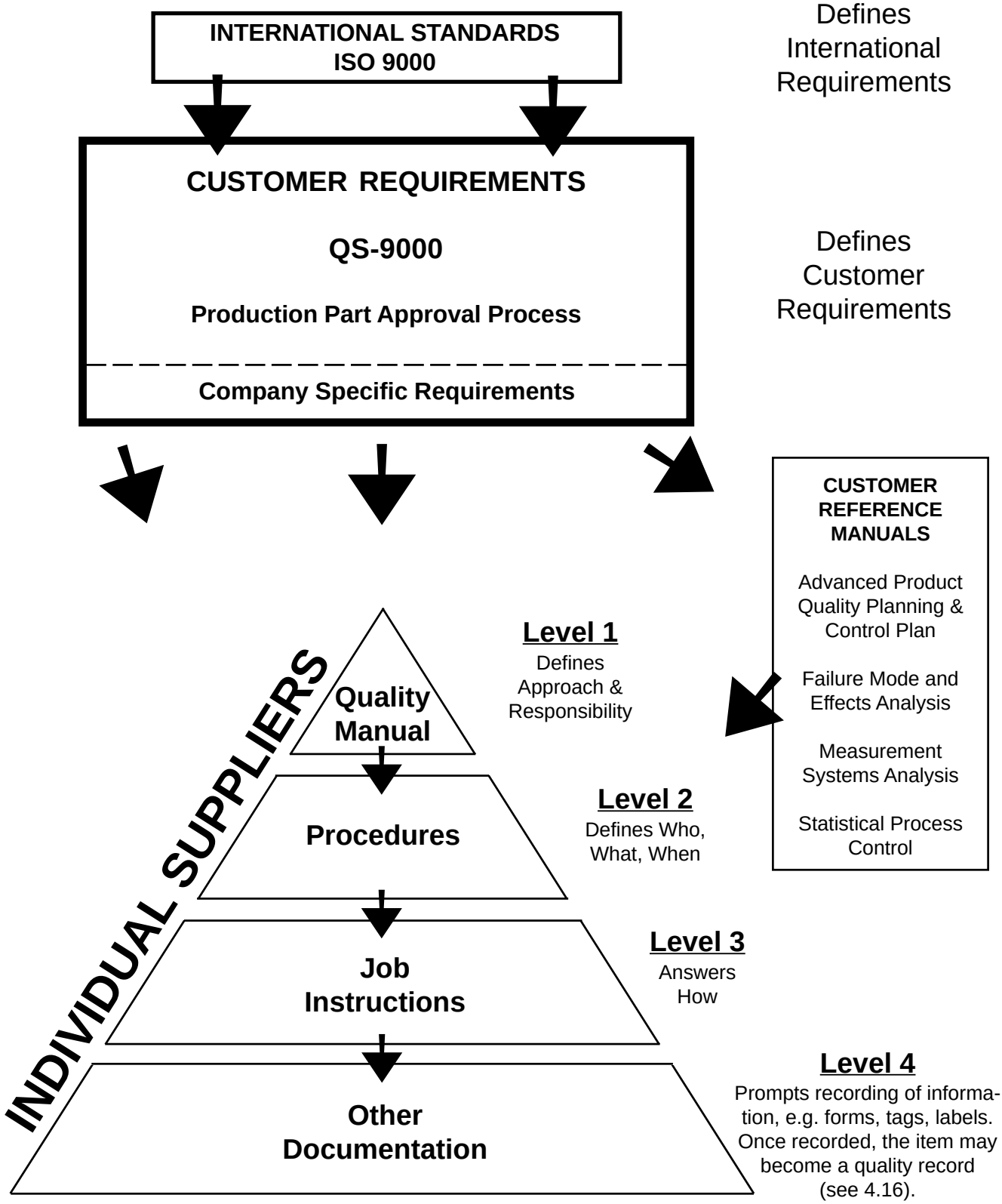
Tooling & Equipment QSA-TE
-First Edition, July 1996

Reliability and Maintainability Guidelines for Manufacturing Machinery and Equipment
-First Edition, 1993
-Published by SAE: 01-412-776-4841 &
National Center for Manufacturing Sciences, Inc.
01-313-995-0300

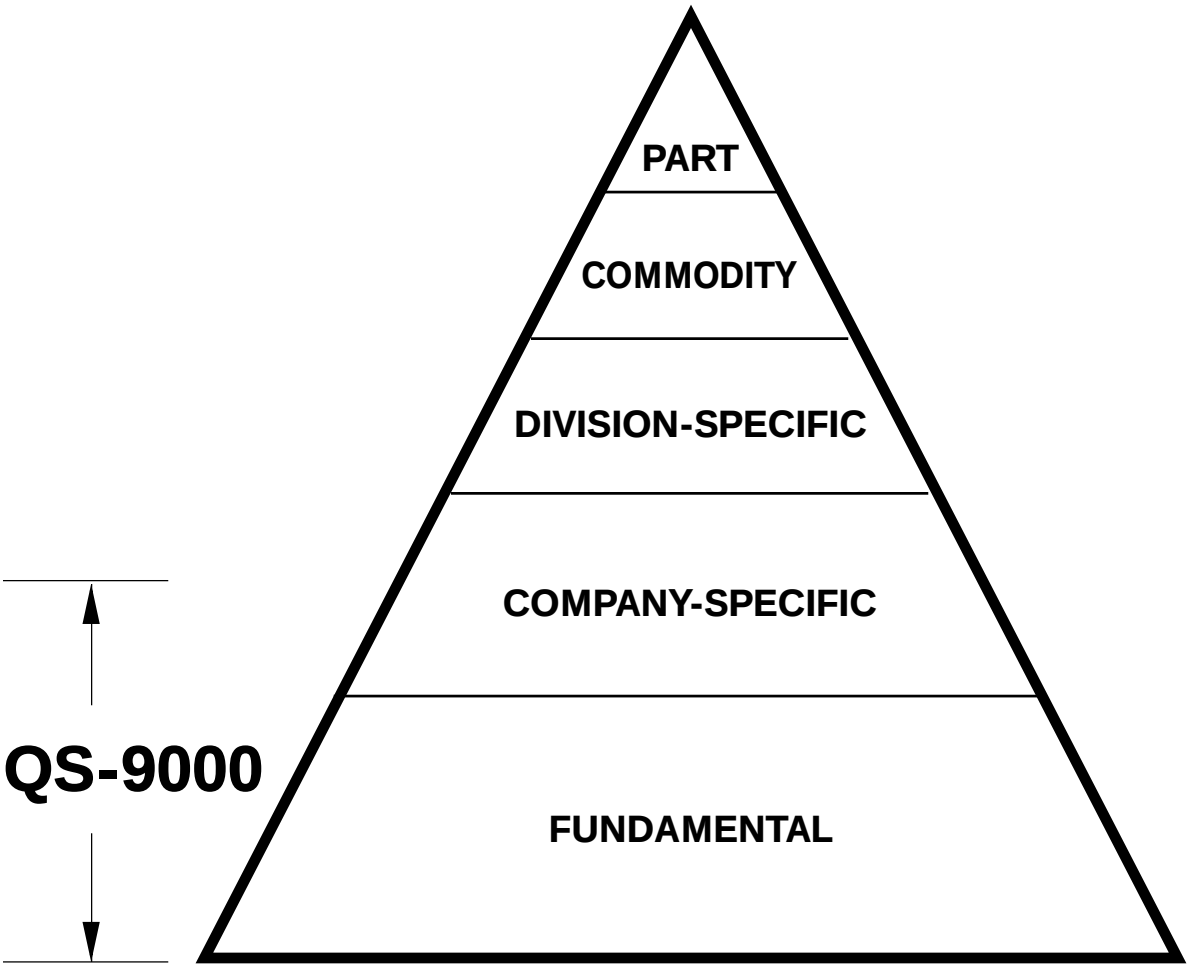
Additional information on quality systems can be found in the following documents:

- ISO 8402:1994 Quality Management and Quality Assurance-Vocabulary
- ISO 8601:1988: Data elements and interchange formats – Information interchange – Representation of dates and times
- ISO 9000-1:1994 Quality Management and Quality Assurance Standards-Part 1: Guidelines for selection and use
- ISO 9000-2:1993 Part 2: Generic guidelines for the application of ISO 9001, ISO 9002 and ISO 9003
- ISO 9004-1:1994 Quality Management and Quality System Elements - Part 1: Guidelines
- ISO 9004-4:1993 Part 4: Guidelines for quality improvement
- ISO 10011-1:1990 Guidelines for Auditing Quality Systems - Part 1: Auditing
- ISO 10011-2:1991 Part 2: Qualification criteria for quality systems auditors
- ISO 10011-3:1991 Part 3: Management of audit programmes.
- ISO 10012-1:1992(E) Quality assurance requirements for measuring equipment - Part 1: Metrological confirmation system for measuring equipment.
- ISO 10013:1995: Guidelines for developing quality manuals
- ISO/IEC Guide 25-1990 General requirements for the competence of calibration and testing laboratories [at the time of publication, ISO/IEC Guide 25 is under revision]
- ISO/IEC Guide 62:1996 (E), General requirements for bodies operating assessment and certification/ registration of quality systems
- IAF Guidance on the Application of ISO/IEC Guide 62:1996, issue 1, 2 June, 1997
- AVSQ ‘94 ANFIA Valutazione Sistemi Qualità, Edizione 3, Febbraio 1995 + Addendum QS-9000 all’ASVQ, Edizione marzo 1997 [Italian Automotive Industry Quality Requirements]
- EAQF94 Evaluation Qualité Fournisseur, 1994 Edition plus QS-9000 Appendix to EAQF March 1997 Edition, [French Automotive Industry Quality Requirements]
- VDA6.1 Qualitätsmanagement in der Automobilindustrie - QM-Systemaudit 3. vollständig überarbeitete Auflage 1996/1, July, 1996 [German Automotive Industry Quality Requirements]

QUALITY SYSTEM DOCUMENTATION PROGRESSION



QUALITY SYSTEM REQUIREMENTS CATEGORIES



QS-9000 defines the fundamental quality system requirements of the subscribing companies. It is recognized that there may be company-specific, division-specific, commodity-specific, and/or part-specific requirements in addition to **QS-9000**.

Section I:

ISO 9000-Based Requirements

Section Organization

- Management Responsibility - Element 4.1
- Quality System - Element 4.2
- Contract Review - Element 4.3
- Design Control - Element 4.4
- Document and Data Control - Element 4.5
- Purchasing - Element 4.6
- Control of Customer-Supplied Product - Element 4.7
- Product Identification and Traceability - Element 4.8
- Process Control - Element 4.9
- Inspection and Testing - Element 4.10
- Control of Inspection, Measuring, and Test Equipment - Element 4.11
- Inspection and Test Status - Element 4.12
- Control of Nonconforming Product - Element 4.13
- Corrective and Preventive Action - Element 4.14
- Handling, Storage, Packaging, Preservation and Delivery - Element 4.15
- Control of Quality Records - Element 4.16
- Internal Quality Audits - Element 4.17
- Training - Element 4.18
- Servicing - Element 4.19
- Statistical Techniques - Element 4.20

Management Responsibility - Element 4.1

Quality Policy - 4.1.1

The supplier's management with executive responsibility shall define and document its policy for quality, including objectives for quality and its commitment to quality. The quality policy shall be relevant to the supplier's organizational goals and the expectations and needs of its customers. The supplier shall ensure that this policy is understood, implemented and maintained at all levels of the organization.

Organization - 4.1.2

Responsibility and Authority - 4.1.2.1

The responsibility, authority and the interrelation of personnel who manage, perform and verify work affecting quality shall be defined and documented, particularly for personnel who need the organizational freedom and authority to:

a) initiate action to prevent the occurrence of any nonconformities relating to product, process and quality system;

NOTE: It is recommended that the personnel responsible for quality have the authority to stop production, if necessary to correct quality problems.

b) identify and record any problems relating to the product, process and quality system;

c) initiate, recommend or provide solutions through designated channels;

d) verify the implementation of solutions;

e) control further processing, delivery or installation of nonconforming product until the deficiency or unsatisfactory condition has been corrected.

f) represent the needs of the customer in internal functions in addressing **QS-9000** requirements (e.g. selection of special characteristics, setting quality objectives, training, corrective & preventive actions, product design and development).

Resources - 4.1.2.2
The supplier shall identify resource requirements and provide adequate resources, including the assignment of trained personnel (see 4.18), for management, performance of work and verification activities, including internal quality audits.

Management Representative - 4.1.2.3
The supplier's management with executive responsibility shall appoint a member of the supplier's own management who, irrespective of other responsibilities, shall have defined authority for

a) ensuring that a quality system is established, implemented and maintained in accordance with this International Standard, and

b) reporting on the performance of the quality system to the supplier's management for review and as a basis for improvement of the quality system.

NOTE 5: *The responsibility of a management representative may also include liaison with external parties on matters relating to the supplier's quality system.*

Organizational Interfaces - 4.1.2.4
The supplier shall have systems in place to ensure management of appropriate activities during concept development through production (refer to **Advanced Product Quality Planning and Control Plan** reference manual). The supplier shall use a multi-disciplinary approach for decision-making and have the ability to communicate necessary information and data in the customer-prescribed format.

NOTE: Typical functions to be included are:
- Engineering/Technical
- Manufacturing/Production
- Industrial Engineering
- Purchasing/Materials Management
- Quality/Reliability
- Cost Estimating
- Product Service
- Management Information Systems/Data Processing
- Packaging Engineering
- Tooling Engineering/Maintenance
- Marketing and Sales
- Subcontractors, as necessary

Information to Management - 4.1.2.5
Management with responsibility and authority for corrective action shall be promptly informed of products or processes which become noncompliant with specified requirements.

Management Review - 4.1.3

The supplier's management with executive responsibility shall review the quality system at defined intervals sufficient to ensure its continuing suitability and effectiveness in satisfying the requirements of this International Standard and the supplier's stated quality policy and objectives (see 4.1.1). Records of such reviews shall be maintained (see 4.16).

Management Review - 4.1.3.1
This Management Review requirement shall include all elements of the entire quality system, not only those specifically required in other elements (e.g. 4.14.3.d).

> **NOTE:** Management Review should be conducted with a multi-disciplinary approach (see Glossary).

Business Plan - 4.1.4

The supplier shall utilize a formal, documented, comprehensive business plan. The Business Plan shall be a controlled document. The content of the Business Plan is not subject to third party audit.

This plan may typically include as applicable:
- Market-related issues
- Financial planning and cost
- Growth projections
- Plant/facilities plans
- Cost objectives
- Human resource development
- R & D plans, projections, and projects with appropriate funding
- Projected sales figures
- Quality objectives
- Customer satisfaction plans
- Key internal quality and operational performance measurables
- Health, Safety and Environmental issues

Goals and plans shall cover short-term (1-2 years) and longer-term (3 years or more). The goals and plans should be based on analysis of competitive products and on benchmarking inside and outside the automotive industry and the supplier's commodity. Methods to determine current and future customer expectations shall be in place. An objective process shall be used to define the scope and collection of information, including the frequency and methods of collection.

Methods to track, update, revise, and review the plan shall be documented to ensure that the plan is followed and communicated throughout the organization as appropriate.

NOTE: Data and information should drive process improvement plans.

NOTE: The supplier should provide means for employee empowerment in meeting business goals.

Analysis and Use of Company Level Data- 4.1.5

The supplier shall document trends in quality, operational performance (productivity, efficiency, effectiveness, cost of poor quality) and current quality levels for key product and service features. These should be compared with those of competitors and/or appropriate benchmarks.

Trends in data and information should be compared with progress toward overall business objectives and lead to action to support:

1) Development of priorities for prompt solutions to customer-related problems,

2) Determination of key customer-related trends and correlations to support status review, decision-making and longer-term planning.

Customer Satisfaction- 4.1.6

The supplier shall have a documented process for determining customer satisfaction, including frequency of determination, and how objectivity and validity are assured. Trends in customer satisfaction and key indicators of customer dissatisfaction shall be documented and supported by objective information. These trends should be compared to those of competitors, or appropriate benchmarks, and reviewed by senior management.

NOTE: Consideration should be given to internal, external and final customers.

Certification Body/Registrar Notification - 4.1.6.1

A supplier shall notify their certification body/registrar in writing within five (5) working days when a customer places the site in any of the following statuses:

- Chrysler “Needs Improvement”
- Ford Q-1 Revocation
- General Motors Level II Containment

Quality System - Element 4.2

General- 4.2.1

The supplier shall establish, document and maintain a quality system as a means of ensuring that product conforms to specified requirements. The supplier shall prepare a quality manual covering the requirements of this International Standard. The quality manual shall include or make reference to the quality system procedures and outline the structure of the documentation used in the quality system.

NOTE 6: *Guidance on quality manuals is given in ISO 10013.*

Quality System Procedures- 4.2.2

The supplier shall

a) prepare documented procedures consistent with the requirements of this International Standard and the supplier's stated quality policy, and

b) effectively implement the quality system and its documented procedures.

For the purposes of this International Standard, the range and detail of the procedures that form part of the quality system shall be dependent upon the complexity of the work, the methods used, and the skills and training needed by personnel involved in carrying out the activity.

NOTE 7: *Documented procedures may make reference to work instructions that define how an activity is performed.*

Quality Planning- 4.2.3

The supplier shall define and document how the requirements for quality will be met. Quality planning shall be consistent with all other requirements of a supplier's quality system and shall be documented in a format to suit the supplier's method of operation. The supplier shall give consideration to the following activities, as appropriate, in meeting the specified requirements for products, projects or contracts:

a) the preparation of quality plans;

b) the identification and acquisition of any controls, processes, equipment (including inspection and test equipment), fixtures, resources and skills that may be needed to achieve the required quality;

c) ensuring the compatibility of the design, the production process, installation, servicing, inspection and test procedures and the applicable documentation;

d) the updating, as necessary, of quality control, inspection and testing techniques, including the development of new instrumentation;

e) the identification of any measurement requirement involving capability that exceeds the known state of the art, in sufficient time for the needed capability to be developed;

f) the identification of suitable verification at appropriate stages in the realization of product;

g) the clarification of standards of acceptability for all features and requirements, including those which contain a subjective element;

h) the identification and preparation of quality records (see 4.16)

NOTE 8: *The quality plans referred to [see 4.2.3a] may be in the form of a reference to the appropriate documented procedures that form an integral part of the supplier's quality system.*

Advanced Product Quality Planning - 4.2.3.1
The supplier shall establish and implement an advanced product quality planning process. The supplier should convene internal multi-disciplinary teams to prepare for production of new or changed products. These teams should use appropriate techniques identified in the **Advanced Product Quality Planning and Control Plan** reference manual. Similar techniques that accomplish the intent are acceptable.

Team actions should include:

- Development/finalization of special characteristics (see Appendix C)
- Development and review of FMEAs
- Establishment of actions to reduce the potential failure modes with high risk priority numbers
- Development or review of Control Plans

Special Characteristics - 4.2.3.2
The supplier's process control guidelines and similar documents (e.g. FMEA's, Control Plans, Operator Instructions) shall be marked with the customer's special characteristic symbol (or the supplier's equivalent symbol or notation) to indicate those process steps that affect Special Characteristics, when Special Characteristics are identified on the customer design record (see Glossary) (see Appendix C).

> **NOTE:** Initially, the customer may determine Special Characteristics and identify them. Special Characteristics may be identified from any product characteristic category, e.g. dimensional, material, appearance, performance.

Feasibility Reviews - 4.2.3.3
The supplier shall investigate and confirm the manufacturing feasibility of proposed products prior to contracting to produce those products. Feasibility is an assessment of the suitability of a particular design, material, or process for production, while conforming to all engineering requirements at the required statistical process capability and at specified volumes.

Feasibility reviews should be documented using the Team Feasibility Commitment in the **Advanced Product Quality Planning and Control Plan** reference manual.

Product Safety - 4.2.3.4
Due care and product safety shall be considered in the supplier's design control (element 4.4) and process control (element 4.9) policies and practices. The supplier should promote internal awareness of safety considerations relative to the supplier's product.

Process Failure Mode and Effects Analysis (Process FMEAs) - 4.2.3.5
Process FMEAs shall consider all Special Characteristics. Efforts shall be taken to improve the process to achieve defect prevention rather than defect detection. Certain customers have FMEA review and approval requirements that shall be met prior to production part approval (see Section II). Refer to the **Potential Failure Mode and Effects Analysis** reference manual.

Mistake Proofing - 4.2.3.6
The supplier shall utilize appropriate mistake proofing methodologies during the planning of processes, facilities, equipment and tooling.

The Control Plan - 4.2.3.7
The supplier shall develop Control Plans at the system, subsystem, component and/or material level, as appropriate for the product supplied.

The Control Plan shall include the information required in the Control Plan form in Appendix J.

The Control Plan requirement encompasses processes producing bulk materials (e.g. steel, plastic resin, paint) as well as those producing parts.

The output of the advanced quality planning process, beyond the development of robust processes, is a Control Plan. Control Plans shall be revised or updated when products or processes differ significantly from those in current production.

The Control Plan should list the controls used for process control (see 4.9). The Control Plan shall cover three distinct phases as appropriate:

- Prototype - a description of the dimensional measurements and material and performance tests that will occur during Prototype build (see **APQP** reference manual). The supplier shall have a prototype control plan if they are required by the customer.

- Pre-launch - a description of the dimensional measurements and material and performance tests that occur after Prototype and before full Production.

- Production - Documentation of product/process characteristics, process controls, tests, and measurement systems that occur during mass production.

The supplier shall use a multi-disciplinary approach to develop Control Plans.

> **NOTE:** A multi-disciplinary approach typically includes the supplier's design, manufacturing, engineering, quality, production, and other appropriate personnel. For external suppliers, it may include the customer's Purchasing, Quality, Product Engineering, customer plant personnel as well as subcontractors.

Control Plans shall be reviewed and updated as appropriate when any of the following occur:

- The product is changed.
- The processes are changed.
- The processes become unstable.
- The processes become non-capable.
- Inspection method, frequency, etc. is revised.

Refer to the **Production Part Approval Process** manual.

Product Approval Process- 4.2.4

General - 4.2.4.1
The supplier shall fully comply with all requirements set forth in the **Production Part Approval Process (PPAP)** manual.

Subcontractor Requirements - 4.2.4.2
Suppliers should utilize a part approval process (e.g. **PPAP**) for subcontractors (see Glossary).

> **NOTE:** Certain customers require that their suppliers use **PPAP** with their subcontractors (See Section II).

Engineering Change Validation - 4.2.4.3
The supplier shall verify that changes are properly validated. See 4.12, 4.16 and **PPAP**.

> **NOTE:** This applies equally to suppliers and subcontractors.

Continuous Improvement- 4.2.5

General - 4.2.5.1
The supplier shall continuously improve in quality, service (including timing, delivery) and price that benefit all customers. This requirement does not replace the need for innovative improvements.

> **NOTE**: A continuous improvement philosophy should be fully deployed throughout the supplier's organization.

Continuous improvement shall extend to **product characteristics** with the highest priority on special characteristics.

> **NOTE**: Cost elements or price should be one of the key indicators within a continuous improvement system.

NOTE: For those product characteristics and process parameters that can be evaluated using variables data, continuous improvement means optimizing the characteristics and parameters at a target value and reducing variation around that value. For those product characteristics and process parameters that can only be evaluated using attribute data, continuous improvement is not possible until characteristics are conforming. If attribute data results do not equal zero defects, it is by definition nonconforming product (see 4.10.1.1, 4.13, 4.14). Improvements made in these situations are by definition corrective actions, not continuous improvement.

The supplier shall develop a prioritized action plan for continuous improvement in processes that have demonstrated stability, acceptable capability and performance.

NOTE: Processes with unacceptable capability/performance require corrective action (see 4.14.2).

Quality and Productivity Improvements - 4.2.5.2

The supplier shall identify opportunities for quality and productivity improvement and implement appropriate improvement projects.

NOTE: Examples of situations which might lead to improvement projects are:

- Unscheduled machine downtime
- Machine setup, die change and machine changeover times
- Excessive cycle time
- Scrap, rework and repair
- Non value-added use of floor space
- Excessive variation
- Less than 100% first run capability
- Process averages not centered on target values (bilateral tolerance)
- Testing requirements not justified by accumulated results
- Waste of labor and materials
- Cost of poor quality
- Difficult assembly or installation of the product
- Excessive handling and storage
- New target values to optimize customer processes
- Marginal measurement system capability (see **MSA** and ISO 10012-1)
- Customer dissatisfaction, e.g. complaints, repairs, returns, mis-shipments, incomplete orders, customer plant concerns, warranty, etc.

Techniques for Continuous Improvement - 4.2.5.3
The supplier shall demonstrate knowledge of appropriate continuous improvement measures and methodologies and shall use those that are appropriate.

> **NOTE:** The following list shows examples of possible techniques which might be used. There may be many other methods which meet specific supplier needs more appropriately.

- Control charts (variables, attributes, CUSUM)
- Design of experiments (DOE)
- Theory of constraints
- Overall equipment effectiveness
- Parts per million (PPM) analysis
- Value analysis
- Benchmarking
- Analysis of motion/ergonomics
- Mistake proofing

Facilities and Tooling Management- 4.2.6

Facilities, Equipment, and Process Planning Effectiveness - 4.2.6.1
The supplier shall use a multi-disciplinary approach for developing facilities, processes and equipment plans in conjunction with the advanced quality planning process. Plant layouts should minimize material travel and handling, facilitate synchronous material flow, and maximize value-added use of floor space. Methods shall be developed for evaluating the effectiveness of existing operations and processes considering the following factors: overall work plan, appropriate automation, ergonomics and human factors, operator and line balance, storage and buffer inventory levels, value-added labor content.

> **NOTE:** The supplier should identify and define appropriate metrics to monitor the effectiveness of existing operations.

Tooling Management - 4.2.6.2
The supplier shall establish and implement a system for tooling management including:

- Maintenance and repair facilities and personnel
- Storage and recovery
- Setup
- Tool change programs for perishable tools
- Tool modification, including tool design documentation

The supplier shall provide appropriate technical resources for tool (see Glossary) and gage design, fabrication and full dimensional inspection. The supplier shall implement a system to track and follow-up on these activities if any of this work is subcontracted.

NOTE: Tooling Management (4.2.6.2) is not required of warehousers or distributors.

Contract Review - Element 4.3

General- 4.3.1

The supplier shall establish and maintain documented procedures for contract review and for the coordination of these activities.

NOTE: The supplier is not required to return signed Purchase Order Acknowledgments unless otherwise specified by the customer.

Review- 4.3.2

Before the submission of a tender, or the acceptance of a contract or order (statement of requirement), the tender, contract or order shall be reviewed by the supplier to ensure that:

a) the requirements are adequately defined and documented; where no written statement of requirement is available for an order received by verbal means, the supplier shall ensure that the order requirements are agreed before their acceptance;
b) any differences between the contract or order requirements and those in the tender are resolved;
c) the supplier has the capability to meet contract or order requirements;
d) all customer requirements, including those in Section II of this document, shall be met.

Amendment to a Contract- 4.3.3

The supplier shall identify how an amendment to a contract is made and correctly transferred to the functions concerned within the supplier's organization.

Records- 4.3.4

Records of contract reviews shall be maintained (see 4.16).

NOTE 9: *Channels for communication and interfaces with the customer's organization in these contract matters should be established.*

Design Control - Element 4.4

NOTE: THIS ELEMENT APPLIES TO DESIGN RESPONSIBLE SUPPLIERS ONLY. A supplier is defined as design-responsible if it has the authority to establish a new, or change an existing product specification for any product shipped to a customer. Customer approval of a design responsible supplier's product does not waive the supplier's design responsible status. Consult your customer for further clarification if needed.

General- 4.4.1

The supplier shall establish and maintain documented procedures to control and verify the design of the product in order to ensure that the specified requirements are met.

Use of Design Data - 4.4.1.1
The supplier shall have a process to deploy information gained from previous design projects to current and future projects of a similar nature.

Design and Development Planning- 4.4.2

The supplier shall prepare plans for each design and development activity. The plans shall describe or reference these activities, and define responsibility for their implementation. The design and development activities shall be assigned to qualified personnel equipped with adequate resources. The plans shall be updated, as the design evolves.

Required Skills - 4.4.2.1
The supplier's design activity should be qualified in the following skills as appropriate:

- Geometric dimensioning and tolerancing (GD&T)
- Quality function deployment (QFD)
- Design for manufacturing (DFM)/Design for assembly (DFA)
- Value engineering (VE)
- Design of experiments (DOE)
- Failure mode and effects analysis (DFMEA/PFMEA, etc.)
- Finite element analysis (FEA)
- Solid modeling
- Simulation techniques
- Computer aided design (CAD)/Computer aided engineering (CAE)
- Reliability engineering plans

Organization and Technical Interfaces- 4.4.3

Organizational and technical interfaces between different groups which input to the design process shall be defined and the necessary information documented, transmitted and regularly reviewed.

Design Input- 4.4.4

Design input requirements relating to the product, including applicable statutory and regulatory requirements, shall be identified, documented and their selection reviewed by the supplier for adequacy. Incomplete, ambiguous or conflicting requirements shall be resolved with those responsible for imposing these requirements.

Design input shall take into consideration the results of any contract review activities.

Design Input - Supplemental - 4.4.4.1
The supplier shall have appropriate resources and facilities to utilize computer-aided product design, engineering and analysis. If these functions are subcontracted, the supplier shall provide technical leadership. The CAD/CAE systems shall be capable of two way interface with customer systems. The requirement for computer-aided systems can be waived by the customer.

Design Output- 4.4.5

Design output shall be documented and expressed in terms that can be verified and validated against design input requirements.

Design output shall:
a) meet the design input requirements;
b) contain or make reference to acceptance criteria;
c) identify those characteristics of the design that are crucial ("Special Characteristics" - see Appendix C) *to the safe and proper functioning of the product (e.g. operating, storage, handling, maintenance and disposal requirements).*

Design output documents shall be reviewed before release.

Design Output - Supplemental - 4.4.5.1
The supplier's design output shall be the result of a process that includes:
- Efforts to simplify, optimize, innovate, and reduce waste (e.g. QFD, DFM/DFA, VE, DOE, tolerance studies, response surface methodology, or appropriate alternatives)
- Utilization of geometric dimensioning and tolerancing as applicable
- Analysis of cost/performance/risk trade-offs
- Use of feedback from testing, production, and the field
- Use of design FMEAs

Design Review- 4.4.6

At appropriate stages of design, formal documented reviews of the design results shall be planned and conducted. Participants at each design review shall include representatives of all functions concerned with the design stage being reviewed, as well as other specialist personnel, as required. Records of such reviews shall be maintained (see 4.16).

Design Verification- 4.4.7

At appropriate stages of design, design verification shall be performed to ensure that the design stage output meets the design stage input requirements. The design verification measures shall be recorded (see 4.16).

NOTE 10: *In addition to conducting design reviews (see 4.4.6), design verification may include activities such as the following:*

- *performing alternative calculations,*
- *comparing the new design with a similar proven design, if available,*
- *undertaking tests and demonstrations, and*
- *reviewing the design stage documents before release.*

Design Validation- 4.4.8

Design validation shall be performed to ensure that product conforms to defined user needs and/or requirements.

Design Validation - Supplemental - 4.4.8.1
Design validation shall be performed in conjunction with customer program timing requirements. Validation results shall be recorded (see 4.16). Design failures shall be documented in the validation records. Procedures for corrective and preventive action shall be followed in addressing such design failures.

NOTES:

11 *Design validation follows successful design verification (see 4.4.7).*

12 *Validation is normally performed under defined operating conditions.*

13 *Validation is normally performed on the final product, but may be necessary in earlier stages prior to product completion.*

14 *Multiple validations may be performed if there are different intended uses.*

Design Changes- 4.4.9

All design changes and modifications shall be identified, documented, reviewed and approved by authorized personnel before their implementation.

Design Changes - Supplemental - 4.4.9.1
All design changes, including those proposed by subcontractors, shall have written customer approval, or waiver of such approval, prior to production implementation. See the **Production Part Approval Process** manual and the customer-specific pages of this document.

For proprietary designs, impact on form, fit, function, performance, and/or durability shall be determined with the customer so that all effects can be properly evaluated.

Design Change Impact - 4.4.9.2
The supplier shall consider the impact of a design change on the system in which the product is used.

Customer Prototype Support- 4.4.10

When required by the customer, the supplier shall have a comprehensive prototype program. The supplier shall use the same subcontractors, tooling and processes, as will be used in production wherever possible.

Performance tests shall consider and include as appropriate product life, reliability and durability. All performance testing activities shall be tracked to monitor timely completion and conformance to requirements.

While these services may be contracted, the supplier shall provide technical leadership.

Confidentiality- 4.4.11

The supplier shall ensure the confidentiality of customer-contracted products under development and related product information.

Document and Data Control - Element 4.5

General- 4.5.1

The supplier shall establish and maintain documented procedures to control all documents and data that relate to the requirements of this International Standard including, to the extent applicable, documents of external origin such as standards and customer drawings.

NOTE 15: *Documents and data can be in the form of any type of media, such as hard copy or electronic media.*

Document and Data Approval and Issue- 4.5.2

The documents and data shall be reviewed and approved for adequacy by authorized personnel prior to issue. A master list or equivalent document control procedure identifying the current revision status of documents shall be established and be readily available to preclude the use of invalid and/or obsolete documents.

This control shall ensure that:

a) the pertinent issues of appropriate documents are available at all locations where operations essential to the effective functioning of the quality system are performed;

NOTE: Examples of appropriate documents include:

- Engineering drawings
- Engineering standards
- Math (CAD) data
- Inspection instructions
- Test procedures
- Work instructions
- Operations sheets
- Quality manual
- Operational procedures
- Quality assurance procedures
- Material specifications

b) invalid and/or obsolete documents are promptly removed from all points of issue or use, or otherwise assured against unintended use;

c) any obsolete documents retained for legal and/or knowledge-preservation purposes are suitably identified.

Engineering Specifications - 4.5.2.1
The supplier shall establish a procedure to assure the timely review (e.g. business "days", not weeks or months), distribution and implementation of all customer engineering standards/specifications and changes. The supplier shall maintain a record of the date on which each change is implemented in production (subject to record control, see 4.16). Implementation shall include updates to all appropriate documents.

> **NOTE:** A change in these specifications should require an updated PPAP record when these specifications are referenced on the design record (see Glossary) or if they affect PPAP documents (e.g. Control Plan, FMEAs, etc.). See **PPAP**.

Document and Data Changes- 4.5.3

Changes to documents and data shall be reviewed and approved by the same functions/organizations that performed the original review and approval, unless specifically designated otherwise. The designated functions/organizations shall have access to pertinent background information upon which to base their review and approval.

Where practicable, the nature of the change shall be identified in the document or the appropriate attachments.

Purchasing - Element 4.6

General- 4.6.1

The supplier shall establish and maintain documented procedures to ensure that purchased product (see 3.1) conforms to specified requirements.

> **NOTE:** The reference above, "see 3.1," is to Section 3.1 in ISO 9001 or 9002 where "product" is defined.

Approved Materials for Ongoing Production - 4.6.1.1
Where the customer has an approved subcontractor list, the supplier shall purchase the relevant materials from subcontractors on the list. Any additional subcontractors may only be used after they have been added to the list by the customer's Materials Engineering activity.

> **NOTE:** To be added to any existing customer "approved subcontractor list", a company should contact the appropriate customer engineering function to be considered. These lists exist only for certain commodities and, where they do exist, they may be found in the customer design record (see Glossary).

Government, Safety and Environmental Regulations - 4.6.1.2
All purchased materials used in part manufacture shall satisfy current governmental and safety constraints on restricted, toxic and hazardous materials; as well as environmental, electrical and electromagnetic considerations applicable to the country of manufacture and sale (see Glossary-Approved Materials).

Evaluation of Subcontractors- 4.6.2

The supplier shall:

a) evaluate and select subcontractors on the basis of their ability to meet subcontract requirements including the quality system and any specific quality assurance requirements;

b) define the type and extent of control exercised by the supplier over subcontractors. This shall be dependent upon the type of product, the impact of subcontracted product on the quality of final product and, where applicable, on the quality audit reports and/or quality records of the previously demonstrated capability and performance of subcontractors;

c) establish and maintain quality records of acceptable subcontractors (see 4.16).

NOTE: Methods other than an "approved subcontractors list" may be utilized to meet this requirement.

Subcontractor Development - 4.6.2.1
The supplier shall perform subcontractor (see Glossary) quality system development with the goal of subcontractor compliance to **QS-9000** using Section I of **QS-9000** as their **fundamental** quality system requirement. Assessments, if part of subcontractor development, should occur at supplier specified frequency. Subcontractor assessments to **QS-9000** by the OEM customer, an OEM customer-approved second party, or an accredited third party certification body/registrar (see Appendix B) will be recognized in lieu of audits by the supplier.

NOTE: Acceptance of the above audits or ISO 9001 or ISO 9002 registration is not intended to limit more specific supplier/ subcontractor quality system and product development.

NOTE: The prioritization of subcontractors for development is dependent upon the needs of the subcontractor relative to the requirements of **QS-9000** and the importance of the product or service they supply.

The use of customer-designated subcontractors does not relieve the supplier of the responsibility for ensuring the quality of subcontracted parts, materials and services.

Scheduling Subcontractors - 4.6.2.2
The supplier shall require 100% on-time delivery performance from subcontractors. The supplier shall provide appropriate planning information and purchase commitments to enable subcontractors to meet this expectation.

The supplier shall implement a system to monitor the delivery performance of subcontractors with corrective actions taken as appropriate. Records of premium freight shall include both supplier and subcontractor paid charges.

Purchasing Data- 4.6.3

Purchasing documents shall contain data clearly describing the product ordered, including where applicable:

a) the type, class, grade or other precise identification;

b) the title or other positive identification, and applicable issues of specifications, drawings, process requirements, inspection instructions and other relevant technical data, including requirements for approval or qualification of product, procedures, process equipment and personnel;

c) the title, number and issue of the quality system standard to be applied.

The supplier shall review and approve purchasing documents for adequacy of specified requirements prior to release.

Verification of Purchased Product- 4.6.4

Supplier Verification at Subcontractor's Premises - ISO 4.6.4.1
Where the supplier proposes to verify purchased product at the subcontractor's premises, the supplier shall specify verification arrangements and the method of product release in the purchasing documents.

Customer Verification of Subcontracted Product - ISO 4.6.4.2
Where specified in the contract, the supplier's customer or the customer's representative shall be afforded the right to verify at the subcontractor's premises and the supplier's premises that subcontracted product conforms to specified requirements. Such verification shall not be used by the supplier as evidence of effective control of quality by the subcontractor.

Verification by the customer shall not absolve the supplier of the responsibility to provide acceptable product, nor shall it preclude subsequent rejection by the customer.

Control of Customer-Supplied Product - Element 4.7

The supplier shall establish and maintain documented procedures for the control of verification, storage and maintenance of customer-supplied product provided for incorporation into the supplies or for related activities. Any such product that is lost, damaged or is otherwise unsuitable for use shall be recorded and reported to the customer (see 4.16).

Verification by the supplier does not absolve the customer of the responsibility to provide acceptable product.

NOTE: Customer-owned returnable packaging is included in this element (see 4.15.4).

Customer Owned Tooling- 4.7.1

Customer-owned tools and equipment shall be permanently marked so that the ownership of each item is visually apparent.

NOTE: An affixed tag specifically containing the part number and/or customer name to identify ownership is the preferred approach. However, this requirement may be met by using a supplier designated number cross-referenced with clear traceability back to the customer.

Product Identification and Traceability - Element 4.8

Where appropriate, the supplier shall establish and maintain documented procedures for identifying the product by suitable means from receipt and during all stages of production, delivery and installation.

> **NOTE:** For **QS-9000**, the words "where appropriate" above are not applicable.

Where and to the extent that traceability is a specified requirement, the supplier shall establish and maintain documented procedures for unique identification of individual product or batches. This identification shall be recorded (see 4.16).

Process Control - Element 4.9

The supplier shall identify and plan the production, installation and servicing processes which directly affect quality and shall ensure that these processes are carried out under controlled conditions. Controlled conditions shall include the following:

a) documented procedures defining the manner of production, installation and servicing, where the absence of such procedures could adversely affect quality;

b) use of suitable production, installation and servicing equipment, and a suitable working environment (see Glossary)*;*

Cleanliness of Premises - 4.9.b.1
The supplier shall maintain premises in a state of order, cleanliness and repair appropriate to the product(s) manufactured.

Contingency Plans - 4.9.b.2
The supplier shall prepare contingency plans (e.g. utility interruptions, labor shortages, key equipment failure) to reasonably protect the customer's supply of product in the event of emergency, excluding natural disaster and acts of God.

c) compliance with reference standards/codes, quality plans and/or documented procedures;

d) monitoring and control of suitable process parameters and product characteristics;

Designation of Special Characteristics - 4.9.d.1
The supplier shall comply with all customer requirements for designation, documentation and control of Special Characteristics. The supplier shall provide documentation showing compliance with these customer requirements as requested by any customer.

> **NOTE:** All product and process characteristics are important and need to be controlled. However, some characteristics, herein referred to as "special", need extra attention because excessive variation in them might affect a product's safety, compliance with government regulations, fit, function, appearance or quality of subsequent manufacturing operations.

e) the approval of processes and equipment, as appropriate;

f) criteria for workmanship, which shall be stipulated in the clearest practical manner (e.g. written standards, representative samples or illustrations);

g) suitable maintenance of equipment to ensure continuing process capability.

Preventive Maintenance - 4.9.g.1

The supplier shall identify key process equipment and provide appropriate resources for machine/equipment maintenance and develop an effective planned total preventive maintenance system. At a minimum, this system shall include:

- A procedure that describes planned maintenance activities
- Scheduled maintenance activities
- Predictive maintenance methods - These methods should include a review of appropriate items such as the manufacturer's recommendations, tool wear, optimization of uptime, correlation of SPC data to preventive maintenance activities, important characteristics of perishable tooling, fluid analysis, infrared monitoring of circuits and vibration analysis
- A procedure providing for packaging and preservation of equipment, tooling and gaging
- Availability of replacement parts for key manufacturing equipment
- Documenting, evaluating and improving maintenance objectives

Where the results of processes cannot be fully verified by subsequent inspection and testing of the product and where, for example, processing deficiencies may become apparent only after the product is in use, the processes shall be carried out by qualified operators and/or shall require continuous monitoring and control of process parameters to ensure that the specified requirements are met.

The requirements for any qualification of process operations, including associated equipment and personnel (see 4.18), shall be specified.

***NOTE 16:** Such processes requiring pre-qualification of their process capability are frequently referred to as special processes.*

Records shall be maintained for qualified processes, equipment and personnel, as appropriate. (see 4.16).

Process Monitoring and Operator Instructions- 4.9.1

The supplier shall prepare documented process monitoring and operator instructions for all employees having responsibilities for operation of processes. These instructions shall be accessible at the work station.

> **NOTE:** Job Instructions (see Glossary) should be available at the time needed without disruption to the job being performed by the operator.

These instructions should be derived from the sources listed in the **Advanced Product Quality Planning and Control Plan** reference manual.

Process monitoring and operator instructions may take the form of process sheets, inspection and laboratory test instructions, shop travelers, test procedures, standard operation sheets, or other documents normally used by the supplier to provide the necessary information.

Process monitoring and operator instructions shall include or reference, as appropriate:

- Operation name and number keyed to the process flow diagram
- Part name and part number, or part family
- Current engineering level/date
- Required tools, gages and other equipment
- Material identification and disposition instructions
- Customer and supplier designated special characteristics
- SPC requirements
- Relevant engineering and manufacturing standards
- Inspection and test instructions (see 4.10.4)
- Reaction plan
- Revision date and approvals
- Visual aids
- Tool change intervals and setup instructions

Maintaining Process Control- 4.9.2

The supplier shall maintain (or exceed) process capability or performance as approved via **PPAP**. To accomplish this, the supplier shall ensure that the Control Plan and Process Flow Diagram (see Glossary) are implemented, including but not limited to, adherence to the specified:

- Measurement technique
- Sampling plans
- Acceptance criteria (see 4.10.1.1)
- Reaction plans when the acceptance criteria is not met

See the **Advanced Product Quality Planning and Control Plan** reference manual.

Significant process events (e.g. tool change, machine repair) should be noted on the control charts (see 4.16).

When process and/or product data indicate a high degree of capability (e.g. Cpk/Ppk $\geq$ 3), the supplier may revise the Control Plan, as appropriate (see **PPAP** and Section II).

The supplier shall initiate the appropriate reaction plan from the Control Plan for characteristics which are identified on the Control Plan and are either unstable or non-capable. Reaction plans should include containment of process output and 100% inspection. A supplier corrective action plan shall then be completed indicating specific timing and assigned responsibilities to assure that the process becomes stable and capable (see 4.10.1.1). The plans are to be reviewed with and approved by the customer when so required.

Modified Process Control Requirements- 4.9.3

In some cases, the customer may require either higher or lower capability or performance (see 4.9.2) requirements. In these cases, the Control Plan shall be annotated accordingly (i.e., in the Product/Process Specification/Tolerance column of the suggested **APQP** Control Plan).

Verification of Job Setups- 4.9.4

Job setups shall be verified whenever a setup is performed (e.g. initial run of a job, material changeover, job change, significant time periods lapsed between runs, etc.).

Job Instructions (see Glossary) shall be available for setup personnel. Last-off part comparisons are recommended. The supplier shall use statistical methods of verification where applicable (see Section II). See Glossary - Setup Verification.

Process Changes- 4.9.5

The supplier shall maintain records of process change effective dates. (see 4.5.3).

NOTE: Changes to promote continuous improvement are encouraged. Consult the customer for guidance on approval requirements for such changes.

Appearance Items- 4.9.6

For suppliers manufacturing parts designated by the customer as "Appearance Items", the supplier shall provide:

- Appropriate lighting for evaluation areas
- Masters for color, grain, gloss, metallic brilliance, texture, distinctness of image (DOI) as appropriate
- Maintenance and control of appearance masters and evaluation equipment (see 4.11.2.b)
- Verification that personnel making appearance evaluations are qualified to do so

Inspection and Testing - Element 4.10

General- 4.10.1

The supplier shall establish and maintain documented procedures for inspection and testing activities in order to verify that the specified requirements for the product are met. The required inspection and testing, and the records to be established, shall be detailed in the quality plan or documented procedures.

Acceptance Criteria for Attribute Characteristics - 4.10.1.1
Acceptance criteria for attribute data sampling plans shall be zero defects. Appropriate acceptance criteria for all other situations (e.g. visual standards) shall be documented by the supplier and approved by the customer.

Receiving Inspection and Testing- 4.10.2

4.10.2.1 *The supplier shall ensure that incoming product is not used or processed (except in the circumstances described in 4.10.2.3) until it has been inspected or otherwise verified as conforming to specified requirements. Verification of conformance to the specified requirements shall be in accordance with the quality plan* (Control Plan) *and/or documented procedures*

4.10.2.2 *In determining the amount and nature of receiving inspection, consideration shall be given to the amount of control exercised at the subcontractor's premises and the recorded evidence of conformance provided.*

4.10.2.3 *Where incoming product is released for urgent production purposes prior to verification, it shall be positively identified and recorded (see 4.16) in order to permit immediate recall and replacement in the event of nonconformity to specified requirements.*

Incoming Product Quality - 4.10.2.4
The supplier's incoming quality system shall use one or more of the following methods:

- Receipt and evaluation of statistical data by the supplier
- Receiving inspection and/or testing (e.g., sampling based on performance)
- Second or third party assessments or audits of subcontractor sites, when coupled with records of acceptable quality performance
- Part evaluation by accredited laboratories

In-process Inspection and Testing- 4.10.3

The supplier shall:

a) inspect and test the product as required by the quality plan (Control Plan) *and/or documented procedures;*

b) hold product until the required inspection and tests have been completed or necessary reports have been received and verified, except when product is released under positive-recall procedures (see 4.10.2.3). Release under positive-recall procedures shall not preclude the activities outlined in 4.10.3a).

c) direct process activities toward defect prevention methods, such as statistical process control, mistake proofing, visual controls, rather than defect detection.

Final Inspection and Testing- 4.10.4

The supplier shall carry out all final inspection and testing in accordance with the quality plan (Control Plan) *and/or documented procedures to complete the evidence of conformance of the finished product to the specified requirements.*

The quality plan (Control Plan) *and/or documented procedures for final inspection and testing shall require that all specified inspection and tests, including those specified either on receipt of product or in-process, have been carried out and that the results meet specified requirements.*

No product shall be dispatched until all the activities specified in the quality plan (Control Plan) *and/or documented procedures have been satisfactorily completed and the associated data and documentation are available and authorized.*

Layout Inspection and Functional Testing - 4.10.4.1
A layout inspection and a functional verification (to applicable customer engineering material and performance standards) shall be performed for all products at a frequency established by the customer (see Section II). Results shall be available for customer review.

Final Product Audit - 4.10.4.2
The supplier shall conduct audits of packaged final product to verify conformance to all specified requirements (e.g. product, packaging, labeling) at an appropriate frequency.

NOTE: This activity, also known as a "dock audit", is based upon sampling and is generally performed after final inspection but prior to shipment. Where customer PPM requirements are met, the frequency of Final Product Audits may be reduced.

Inspection and Test Records- 4.10.5

The supplier shall establish and maintain records which provide evidence that the product has been inspected and/or tested. These records shall show clearly whether the product has passed or failed the inspections and/or tests according to defined acceptance criteria. Where the product fails to pass any inspection and/or test, the procedures for the control of nonconforming product shall apply (see 4.13).

Records shall identify the inspection authority responsible for the release of the product (see 4.16).

Supplier Laboratory Requirements- 4.10.6

NOTE: Element 4.10.6 applies to supplier in-house laboratory facilities, not inspection or testing performed outside of a laboratory facility.

Laboratory Quality Systems - 4.10.6.1
The laboratory (supplier's testing facility - chemical, metallurgical, reliability, test validation, e.g. fastener labs) shall have a laboratory scope (see Glossary). The laboratory shall document all its policies, systems, programs, procedures, instructions and findings which enable the laboratory to assure the quality of the tests or calibration results it generates within the scope (see 4.2.1).

NOTE: Accreditation of supplier facilities to ISO/IEC Guide 25 or national equivalent is not required by, nor does it satisfy, all **QS-9000** requirements for a laboratory. Therefore, the laboratory should be included in the on-site audits.

Laboratory Personnel - 4.10.6.2
The personnel making professional judgment with reference to testing and/or calibration shall have appropriate background and experience (see 4.1.2.2).

NOTE: Such background should include both theoretical and recent practical experience.

Laboratory Product Identification and Testing - 4.10.6.3
The laboratory shall have procedures for the receipt, identification, handling, protection and retention or disposal of test samples and/or

calibration equipment items, including all provisions necessary to protect the integrity of the items (see 4.15). The items shall be retained until final data is complete throughout the life of the item in the laboratory, enabling traceability from final data to raw data (see Glossary and 4.10.1).

Laboratory Process Control - 4.10.6.4
The laboratory shall monitor, control and record (see 4.16) environmental conditions as required by relevant specifications or where they may influence the quality of results. Requirements for environmental conditions (e.g. biological sterility, dust, electromagnetic interference, radiation, humidity, electrical supply, temperature, and sound and vibration levels) shall be established and maintained as appropriate to the technical activities concerned.

Laboratory Testing and Calibration Methods - 4.10.6.5
The laboratory shall use test and/or calibration methods, including those for sampling, which meet the needs of the customer and are appropriate for the tests and/or calibrations it undertakes, preferably the current issue of those published as international, regional, or national standards (see 4.11). The laboratory shall verify its capability to perform to the standard specifications before carrying out such work. When it is necessary to employ methods not covered by standard specifications, these shall be subject to agreement with the customer.

Laboratory Statistical Methods - 4.10.6.6
Appropriate statistical techniques should be applied to verification activities whose deliverables are data (see. 4.20).

Accredited Laboratories- 4.10.7

Commercial/independent laboratory facilities used by the supplier shall be accredited laboratory (see Glossary) facilities. Reference the customer-specific pages of this document and the Glossary.

NOTE: Commercial/independent laboratories cannot be registered to **QS-9000**.

NOTE: For further guidance on Element 4.10.7, see ISO/IEC Guide 25 or national equivalent.

Control of Inspection, Measuring and Test Equipment - Element 4.11

General- 4.11.1

The supplier shall establish and maintain documented procedures to control, calibrate and maintain inspection, measuring and test equipment (including test software) used by the supplier to demonstrate the conformance of product to the specified requirements. Inspection, measuring and test equipment shall be used in a manner which ensures that the measurement uncertainty is known and is consistent with the required measurement capability.

> **NOTE:** Additional guidance on measurement uncertainty may be found in ISO 10012-1:1992 (E). The choice of the specific method to be used should be based upon sound technical knowledge of the complete measurement system, the conditions under which it will operate, and the uses for which the data are being produced.

Where test software or comparative references such as test hardware are used as suitable forms of inspection, they shall be checked to prove that they are capable of verifying the acceptability of product, prior to release for use during production, installation, or servicing, and shall be rechecked at prescribed intervals. The supplier shall establish the extent and frequency of such checks and shall maintain records as evidence of control (see 4.16).

Where the availability of technical data pertaining to the inspection, measuring, and test equipment is a specified requirement, such data shall be made available, when required by the customer or customer's representative, for verification that the inspection, measuring, and test equipment is functionally adequate.

> ***NOTE 17:*** *For the purposes of this International Standard, the term "measuring equipment" includes measurement devices.*

Control Procedure- 4.11.2

The supplier shall:

a) determine the measurements to be made and the accuracy required, and select the appropriate inspection, measuring and test equipment that is capable of the necessary accuracy and precision;

b) identify all inspection, measuring and test equipment that can affect product quality, and calibrate and adjust them at prescribed intervals, or prior to use, against certified equipment having a known valid relationship to internationally or nationally recognized standards. Where no such standards exist, the basis used for calibration shall be documented;

NOTE: "inspection, measuring and test equipment" includes equipment in tooling departments used to qualify or maintain production tools regardless of ownership.

Calibration Services - 4.11.2.b.1
Calibration of inspection, measuring or test equipment shall be conducted by a qualified in-house laboratory (see 4.10.6), a qualified commercial/independent laboratory (see 4.10.7), or a customer-recognized government agency. The laboratory scope shall include the calibration of such equipment.

Commercial/ independent calibration facilities shall be accredited to ISO/IEC Guide 25 or national equivalent or have evidence, e.g. assessment by an OEM customer or an OEM customer-approved second party, that they meet the intent of ISO/IEC Guide 25 or national equivalent.

NOTE: Where a qualified laboratory does not exist for a given piece of equipment, calibration services may be performed by the original equipment manufacturer.

c) define the process employed for the calibration of inspection, measuring and test equipment, including details of equipment type, unique identification, location, frequency of checks, check method, acceptance criteria and the action to be taken when results are unsatisfactory;

d) identify inspection, measuring and test equipment with a suitable indicator or approved identification record to show the calibration status;

NOTE: A serial number traceable to the device calibration record meets the intent of this requirement.

e) maintain calibration records for inspection, measuring and test equipment (see 4.16);

f) assess and document the validity of previous inspection and test results when inspection, measuring or test equipment is found to be out of calibration;

g) ensure that the environmental conditions are suitable for the calibrations, inspections, measurements and tests being carried out;

h) ensure that the handling, preservation and storage of inspection, measuring and test equipment is such that the accuracy and fitness for use is maintained;

i) safeguard inspection, measuring and test facilities, including both test hardware and test software, from adjustments which would invalidate the calibration setting.

NOTE: Inspection, measuring and test facilities is generally understood to mean inspection, measuring and test equipment where test results can be invalidated by inappropriate adjustment at the audited site.

NOTE 18: *The metrological confirmation system for measuring equipment given in ISO 10012 may be used for guidance.*

Inspection, Measuring, and Test Equipment Records- 4.11.3

Records of the calibration (see Glossary) activity for all gages, measuring, and test equipment, including those owned by employees, shall include:

- Revisions following engineering changes (if appropriate);
- Any out of specification readings as received for calibration;
- Statements of conformance to specification after calibration;
- Notification to the customer if suspect material or product (see Glossary) may have been shipped.

Measuring System Analysis- 4.11.4

Appropriate statistical studies shall be conducted to analyze the variation present in the results of each type of measuring and test equipment system. This requirement shall apply to measurement systems referenced in the Control Plan (see 4.2.3.7). The analytical methods and acceptance criteria used should conform to those in the **Measurement Systems Analysis** reference manual (e.g. bias, linearity, stability, repeatability and reproducibility studies). Other analytical methods and acceptance criteria may be used if approved by the customer.

Inspection and Test Status - Element 4.12

The inspection and test status of product shall be identified by suitable means, which indicates the conformance or nonconformance of product with regard to inspection and tests performed. The identification of inspection and test status shall be maintained, as defined in the quality plan (Control Plan) *and/or documented procedures, throughout production, installation and servicing of the product to ensure that only product that has passed the required inspections and tests [or released under an authorized concession (see 4.13.2)] is dispatched, used or installed.*

NOTE: Location of product in the normal production flow does not constitute suitable indication of inspection and test status unless inherently obvious (e.g. material in automated production transfer process). Latitude is permitted, beyond automated production transfer processes, if the test status is clearly identified, documented, and achieves the designated purpose.

Supplemental Verification- 4.12.1

When required by the customer, additional verification/ identification requirements shall be met (e.g. new model introduction).

Control of Nonconforming Product - Element 4.13

General- 4.13.1

The supplier shall establish and maintain documented procedures to ensure that product that does not conform to specified requirements is prevented from unintended use or installation. This control shall provide for identification, documentation, evaluation, segregation (when practical), disposition of nonconforming product, and for notification to the functions concerned.

Suspect Material or Product - 4.13.1.1
This element shall apply to suspect material or product (see Glossary) as well as nonconforming product.

Visual Identification - 4.13.1.2
The supplier shall provide visual identification of any nonconforming or suspect material or product (see Glossary), and any quarantine areas.

Review and Disposition of Nonconforming Product- 4.13.2

The responsibility for review and authority for the disposition of nonconforming product shall be defined. Nonconforming product shall be reviewed in accordance with documented procedures. It may be

a) reworked to meet the specified requirements,
b) accepted with or without repair by concession,
c) re-graded for alternative applications, or
d) rejected or scrapped.

Where required by the contract, the proposed use or repair of product [see 4.13.2b)] which does not conform to specified requirements shall be reported for concession to the customer or customer's representative. The description of nonconformity that has been accepted, and of repairs, shall be recorded to denote the actual condition. (see 4.16).

Repaired and/or reworked product shall be reinspected in accordance with the quality plan (Control Plan) *and/or documented procedure.*

Prioritized Reduction Plans - 4.13.2.1
The supplier shall quantify and analyze nonconforming product and establish a prioritized reduction plan. Progress toward the plan should be tracked.

Control of Reworked Product- 4.13.3

Rework (see Glossary) instructions shall be accessible and utilized by the appropriate personnel in their work areas.

There shall be no rework visible on the exterior of the products supplied for service applications without prior approval of the customer service parts organization.

> **NOTE:** Service applications refers to parts and materials provided to dealers and other distribution channels for the purpose of vehicle maintenance and repair.

Engineering Approved Product Authorization- 4.13.4

The supplier shall obtain prior customer authorization whenever the product or process is different from that currently approved (see **Production Part Approval Process** manual). This applies equally to products or services purchased from subcontractors. The supplier shall concur with any requests by a subcontractor before submission to the customer. The supplier shall maintain a record of the expiration date or quantity authorized. The supplier shall also ensure compliance with the original or superseding specifications and requirements when the authorization expires. Material shipped on an authorization shall be properly identified on each shipping container.

Corrective and Preventive Action - Element 4.14

General- 4.14.1

The supplier shall establish and maintain documented procedures for implementing corrective and preventive action.

Any corrective or preventive action taken to eliminate the causes of actual or potential nonconformities shall be to a degree appropriate to the magnitude of problems and commensurate with the risks encountered.

The supplier shall implement and record any changes to the documented procedures resulting from corrective and preventive action.

Problem Solving Methods - 4.14.1.1
A supplier shall use disciplined problem solving methods when an internal or external nonconformance to specification or requirement occurs. When external nonconformances occur, the supplier shall respond in a manner prescribed by the customer. Refer to the customer documents.

Mistake Proofing - 4.14.1.2
The supplier shall use mistake proofing methodology in their corrective and preventive action process to a degree appropriate to the magnitude of the problems and commensurate with the risks encountered.

Corrective Action- 4.14.2

The procedures for corrective action shall include:

a) the effective handling of customer complaints and reports of product nonconformities;

b) investigation of the cause of nonconformities relating to product, process and quality system, and recording the results of the investigation (see 4.16);

c) determination of the corrective action needed to eliminate the cause of nonconformities;

d) application of controls to ensure that corrective action is taken and that it is effective.

Returned Product Test/Analysis - 4.14.2.1
The supplier shall analyze parts returned from the customer's manufacturing plants, engineering facilities, and dealerships. Records of these analyses shall be kept and made available upon request. The supplier shall perform effective analysis and where appropriate, initiate corrective action and process changes to prevent recurrence.

Corrective Action Impact - 4.14.2.2
Where applicable the supplier shall apply the corrective action taken, and controls implemented, to eliminate the cause of a nonconformity to other similar processes and products.

Preventive Action- 4.14.3

The procedures for preventive action shall include:

a) the use of appropriate sources of information such as processes and work operations which affect product quality, concessions, audit results, quality records, service reports and customer complaints to detect, analyze and eliminate potential causes of nonconformities;

b) determination of the steps needed to deal with any problems requiring preventive action;

c) initiation of preventive action and application of controls to ensure that it is effective;

d) ensuring that relevant information on actions taken is submitted for management review (see 4.1.3.).

Handling, Storage, Packaging, Preservation and Delivery - Element 4.15

General- 4.15.1

The supplier shall establish and maintain documented procedures for handling, storage, packaging, preservation and delivery of product.

Handling- 4.15.2

The supplier shall provide methods of handling product that prevent damage or deterioration.

Storage- 4.15.3

The supplier shall use designated storage areas or stock rooms to prevent damage or deterioration of product, pending use or delivery. Appropriate methods for authorizing receipt to and dispatch from such areas shall be stipulated.

In order to detect deterioration, the condition of product in stock shall be assessed at appropriate intervals.

Inventory - 4.15.3.1
The supplier shall use an inventory management system to optimize inventory turns over time, assure stock rotation and minimize inventory levels.

Packaging- 4.15.4

The supplier shall control packing, packaging and marking processes (including materials used) to the extent necessary to ensure conformance to specified requirements.

Customer Packaging Standards - 4.15.4.1
The supplier shall comply with all unique customer packaging standards/ guidelines, including applicable service part packaging standards.

Labeling - 4.15.4.2
The supplier shall develop a system to ensure that all materials shipped are labeled according to customer requirements (see Section II).

Preservation- 4.15.5

The supplier shall apply appropriate methods for preservation and segregation of product when the product is under the supplier's control.

Delivery- 4.15.6

The supplier shall arrange for the protection of the quality of product after final inspection and test. Where contractually specified, this protection shall be extended to include delivery to destination.

Supplier Delivery Performance Monitoring - 4.15.6.1
The supplier shall establish systems to support 100% on-time shipments to meet customer production and service requirements. If l00% on-time shipments are not maintained the supplier shall implement corrective action to improve delivery performance, including communication of delivery problem information to the customer.

A supplier shall have a systematic approach to develop, evaluate and monitor adherence to established lead time requirements. The supplier shall implement a system to monitor performance to the customer delivery requirements with corrective actions taken as appropriate. Records of supplier responsible premium freight shall be maintained.

The supplier shall ship all materials in conformance with customer requirements, adhering to up-to-date customer-specified transportation mode, routings and containers.

Production Scheduling - 4.15.6.2
The supplier's production scheduling activity shall be order-driven.

> **NOTE:** The use of small lots with a goal of one piece flow in a synchronous manner is encouraged.

> **NOTE:** If the supplier's production is scheduled based upon a "forecast," this would not meet the intent of the requirement. A "pull" system (parts/replenishment based upon consumption) utilizing an optimal level of inventory on hand which is commensurate with total process cycle time satisfies the intent of an order-driven system.

Electronic Communication - 4.15.6.3
The supplier shall have a computerized system for receipt of customer planning information and ship schedules, unless waived by the customer.

Shipment Notification System - 4.15.6.4
The supplier shall have a computerized system for on-line transmittal of advance shipment notifications (ASNs), transmitted at the time of shipment, unless waived by the customer.

The supplier shall have a back-up method in the event that the on-line system fails. The supplier shall verify that all ASNs match shipping documents and labels.

Control of Quality Records - Element 4.16

The supplier shall establish and maintain documented procedures for identification, collection, indexing, access, filing, storage, maintenance and disposition (DISPOSAL) *of quality records.*

Quality records shall be maintained to demonstrate conformance to specified requirements and the effective operation of the quality system. Pertinent quality records from the subcontractor shall be an element of these data.

All quality records shall be legible and shall be stored and retained in such a way that they are readily retrievable in facilities that provide a suitable environment to prevent damage or deterioration and to prevent loss. Retention times of quality records shall be established and recorded. Where agreed contractually, quality records shall be made available for evaluation by the customer or the customer's representative for an agreed period.

> ***NOTE 19:*** *Records can be in the form of any type of media, such as hard copy or electronic media.*

Record Retention- 4.16.1

Production part approvals, tooling records, purchase orders and amendments shall be maintained for the length of time that the part (or family of parts) is active for production and service requirements plus one calendar year unless otherwise specified by the customer (see Glossary - Active Part).

> **NOTE:** All customer purchase orders/amendments are included in this requirement. Supplier purchase orders/amendments for customer-owned tooling are included in this requirement.

Quality performance records (e.g. control charts, inspection and test results) shall be retained for one calendar year after the year in which they were created.

Records of internal quality system audits and management review shall be retained for three years.

Retention periods longer than those specified above may be specified by a supplier in their procedures. The supplier shall eventually dispose of records.

This requirement does not supersede any governmental requirements. All specified retention periods shall be considered “minimums”.

Internal Quality Audits - Element 4.17

The supplier shall establish and maintain documented procedures for planning and implementing internal quality audits to verify whether quality activities and related results comply with planned arrangements and to determine the effectiveness of the quality system.

Internal quality audits shall be scheduled on the basis of the status and importance of the activity to be audited and shall be carried out by personnel independent of those having direct responsibility for the activity being audited.

NOTE: "Activity" can refer to departments, areas, processes, functions, etc. in a company.

NOTE: There is no specified checklist that MUST be used for internal auditing purposes.

The results of the audits shall be recorded (see 4.16) and brought to the attention of the personnel having responsibility in the area audited. The management personnel responsible for the area shall take timely corrective action on the deficiencies found during the audit.

Follow-up audit activities shall verify and record the implementation and effectiveness of the corrective action taken (see 4.16).

NOTES:

20 *The results of internal quality audits form an integral part of the input to management review activities (see 4.1.3.)*

21 *Guidance on quality system audits is given in ISO 10011.*

Internal Audit Schedules- 4.17.1

Internal auditing should cover all shifts and be conducted according to an audit schedule updated annually. When internal/external nonconformances or customer complaints occur, the planned audit frequency should be increased.

Training - Element 4.18

The supplier shall establish and maintain documented procedures for identifying training needs and provide for the training of all personnel performing activities affecting quality. Personnel performing specific assigned tasks shall be qualified on the basis of appropriate education, training and/or experience, as required. Appropriate records of training shall be maintained (see 4.16).

Training Effectiveness- 4.18.1

Training effectiveness shall be periodically reviewed.

NOTE: Training effectiveness may be practically reviewed by various methods, such as pre-and post-testing and audits/appraisals of performance.

Servicing - Element 4.19

Where servicing is a specified requirement, the supplier shall establish and maintain documented procedures for performing, verifying and reporting that the servicing meets the specified requirements.

NOTE: Any after-sales product servicing provided as part of the OEM contract or Purchase Order would fall under Element 4.19.

Feedback of Information from Service- 4.19.1

A procedure for communication of information on service concerns to manufacturing, engineering and design activities shall be established and maintained.

NOTE: The intent of the addition of "service concerns" to Element 4.19 is to ensure that the supplier's organization is aware of nonconformities that occur external to the supplier's own organization (see 4.14).

Statistical Techniques - Element 4.20

Identification of Need- 4.20.1

The supplier shall identify the need for statistical techniques required for establishing, controlling and verifying process capability and product characteristics.

Procedures- 4.20.2

The supplier shall establish and maintain documented procedures to implement and control the application of the statistical techniques identified in 4.20.1.

Selection of Statistical Tools- 4.20.3

Statistical tools, if applicable, for each process should be determined during advanced quality planning and shall be included in the Control Plan.

Knowledge of Basic Statistical Concepts- 4.20.4

Basic concepts such as variation, control (stability), capability and overadjustment should be understood throughout the supplier's organization as appropriate.

Consult the **Statistical Process Control** reference manual.

Section II:

Customer-specific Requirements

Section Organization

- Chrysler-Specific Requirements
- Ford-Specific Requirements
- General Motors-Specific Requirements
- Other OEM-Specific Requirements

Chrysler-Specific Requirements

Third-Party Registration Requirements
All Production and Service Part suppliers to Chrysler shall be Third-Party Registered to **QS-9000**.

Product Creation Process
Reference Figure 1 showing the Chrysler Product Creation Process. Chrysler has a documented method of Product Assurance Planning (PAP). This method combined with the team's dedication and knowledge is the tool used throughout the product creation process to consistently develop and produce products that will satisfy the customer. All team members including suppliers shall participate in producing products using Chrysler's PAP method. On occasions when Chrysler's PAP method is not required, products shall be developed according to the Advanced Product Quality Planning (APQP) and Control Plan.

Chrysler Product Creation Process

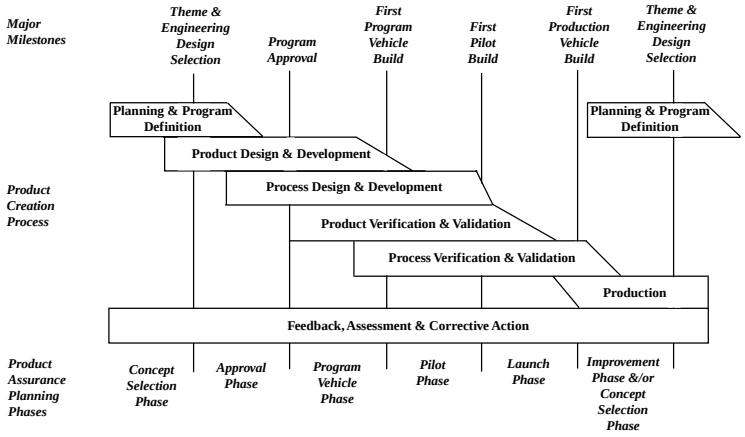


Fig. 1

Special Characteristics Identified with Symbols
Special emphasis shall be placed on product characteristics identified with the symbols indicated below:

The Shield ⛉ <S>; also <E>, <N>, <T>, <H>

The Shield identifies Special Characteristics for a Safety/Regulatory part, characteristic, or product requirement that requires special manufacturing control applicable to a material, performance, or assembly operation to assure compliance with Corporate or government vehicle safety requirements. Suppliers (if applicable) shall be knowledgeable of the following standards: <S> PF-Safety, <E> PF-Emissions, <N> PF-Noise, <T> PF-Theft-Prev, <H> PS-9336. <S> designates regulatory requirements. <E> designates Government-regulated Emissions requirements. <N> designates Regulatory Noise requirements. <T> designates Theft-Prevention requirements. <H> designates Homologation sensitive requirements. For further detail, suppliers shall refer to MASSE #40-8001.

The Diamond ◊ <D>

The Diamond identifies Characteristics for specifications of a component, material, assembly or vehicle assembly operation that are designated by Chrysler as key to function and having particular quality, reliability and durability significance of the finished product. Diamonds also highlight important characteristics on fixtures and gauging procedures during design verification, product validation, or revalidation. While all dimensions and specifications included in engineering documents are important, it is recognized that certain dimensions and/or specifications have more significance relative to assuring against part failure or functional dissatisfaction. The Symbol <D> identifies key but non-safety/non-regulatory product characteristics or processes that may be susceptible to manufacturing variation and require additional controls to assure conformance to specifications and customer satisfaction. Presence of a Diamond does not affect the significance to a Shield(s) on the same document. For further detail, suppliers shall refer to PS-7300.

Significant Characteristics

Significant Characteristics are Special Characteristics selected by the supplier through knowledge of the product and process.

Annual Layout

To ensure continuing conformance to all Chrysler requirements, a complete annual layout inspection shall be required for all parts.

Product Verification/Design Validation
The supplier shall perform product verification/ design validation at least once per model year on all new and carryover products unless a different frequency is specifically referred to in the Chrysler specification(s).

Internal Quality Audits
The supplier shall conduct an internal quality audit at least once per year.

Corrective Action Plan
A written corrective action plan following the "Chrysler 7-Step Corrective Action Process" format shall be submitted to the Chrysler Supplier Quality Specialist addressing all nonconformances. Documentation shall include:

Description of the Issue/Nonconformance
Definition/Root Cause
Interim action and Effective Date
Permanent action and Effective Date
Verification
Control
Prevention

Appearance Masters
Appearance masters shall be approved by Chrysler's Design Office.

Packaging, Shipping and Labeling
Suppliers shall be familiar and comply with Chrysler packaging, shipping and labeling instructions.

Process Approval
A systematic and sequential review of the supplier's process shall be completed through a Process Sign-Off (PSO) performed by the Product Team. The purpose is to verify the supplier's process readiness and to assure understanding of complete program requirements, prior to a PPAP submittal.

A Chrysler-led Process Sign-Off shall be performed for parts that have a high initial risk evaluation as identified by the Product Team or parts that have been out of production for 12 months or more. All parts that have a medium initial risk evaluation shall be reviewed by the Product Team to determine the need for a Chrysler-led PSO. Low risk parts and medium risk parts not selected for PSO shall have a supplier-led PSO to establish production readiness.

PSO should be completed prior to providing PØ level parts to the pilot facility. The PSO shall be completed prior to C1 build.

PSO shall be completely approved prior to a PPAP submission.

Control Plans
Control plans are required for prototype, pre-launch, and production phases. A Chrysler representative's signature is not required on Control Plans, unless specifically requested by the Buyer or Quality Specialist.

"Forever" Requirements-Extended Enterprise™
The role of the supplier in the Extended Enterprise™ network: The supplier shall proactively communicate with Chrysler regarding changes that may impact product quality. Specifically, notification to the Supplier Quality Manager and Purchasing Agent shall be completed verbally with written follow up before any of the following can be implemented at the supplier's location or any sub-supplier location:

- Proposed Material Changes
- Proposed Process Changes
- Proposed Manufacturing Location Changes

The supplier shall notify the Supplier Quality Manager and Purchasing Agent when they become aware of:

- Sub-supplier Issues
- Potential Supply or Capacity Issues

Electronic Communication (SPIN Connection)
The supplier shall establish a Chrysler SPIN (Supply Partner Information Network) connection. Instructions for SPIN connection can be obtained on the Internet at www.spin.chrysler.com or by calling the Chrysler Help Desk 01-810-274-6000, press Ø, then 2 (or in the U.S. Only at 1-800-332-9978, press Ø, then 2).

Chrysler Bibliography

The following publications contain additional information that will be of assistance to Chrysler suppliers:

Manual Type and Name	Revision Date	Ed. No.	Order Source	Contact Number
Design Verification Plan & Report	Apr 1992		Xerox Corp.	248-616-3379
Design Verification Plan & Report (Diskette)	Apr 1992		Xerox Corp.	248-616-3379
PS 7300/Key Quality Characteristics	Dec 1997		ISD Corp.	616-396-0880
Packaging & Shipping Instructions	Oct 1997		Xerox Corp.	248-616-3379
Product Assurance Planning	Dec 1997	3rd Ed.	Xerox Corp.	248-616-3379
Process Sign-Off	Apr 1997	2nd Ed.	Xerox Corp.	248-616-3379
Chrysler 7-Step Corrective Action Process	Apr 1997		Xerox Corp.	248-616-3379
Mfg. Assurance Standard-Safety/Emission MASSE #40-8001	Apr 1997	7thEd.	Chrysler Stds. Office	248-576-3877

Chrysler Glossary

Product Team, at a minimum, includes Supplier Quality Specialist, Engineer and supplier representatives.

Notes

Ford-Specific Requirements

Third-Party Registration Requirements

Suppliers to Ford are not required to pursue third-party registration at this time. Ford Australia unique suppliers shall be third-party registered to **QS-9000**.

Control Item (∇) Parts

Control Item Parts are selected products identified by Ford Product Engineering on drawings and specifications with an inverted delta (∇) preceding the part and/or material number. Control Item products have Critical Characteristics (refer to Ford Glossary) that may affect safe vehicle operation and/or compliance with government regulations. Unique symbols identifying safety and regulatory characteristics on components designed by other companies (e.g. Mazda) are equivalent to the inverted delta (∇) symbol. Examples are the Mazda "A" and "AR" symbols which are to be treated as ∇. Special requirements for Control Item Parts are:

Control Plans and FMEAs

Signatory approval by the Ford design and quality engineers shall be obtained. The same approvals shall be obtained for revisions to these documents. When the supplier is responsible for the design (black/gray boxes, full service suppliers, integrators), the supplier shall also prepare a design FMEA.

Shipping Container Label

The inverted delta symbol shall precede the Ford part number in accordance with the **Packaging Guidelines for Production Parts**, Form 1750 (North America) or 1750EU (Europe).

Annual Layout

All product characteristics shall be measured at a minimum annually to demonstrate conformance to specified requirements. Characteristics which are enumerated on a Control Plan and are measured more frequently than once per year will not require annual layout.

Setup Verification

Setup Verification shall be completed for all Critical and Significant Characteristics in applications where the setup of the process impacts process performance.

Control Item (∇) Fasteners

The following controls shall be included in the Control Plan for fasteners that are Control Items:

Material Analysis - Heat-Treated Parts
Prior to release of metal from an identified mill heat, a sample from at least one coil or bundle of wire, rod, strip, or sheet steel shall be analyzed and tested to determine its conformance to specifications for chemical composition and quenched hardness. A sample from each additional coil or bundle in the heat shall be tested for either chemical composition or quenched hardness. The results shall be documented and referenced to the steel supplier's mill heat number.

Material Analysis - Non Heat-Treated Parts
The identification of each coil or bundle of wire, rod, strip, or sheet steel shall be visually checked to determine that the mill heat number agrees with the steel supplier's mill analysis document and applicable specifications. Each coil or bundle shall be tested for hardness and other applicable physical properties.

Lot Traceability
Lot Traceability shall be maintained.

Heat Treating

Suppliers and subcontractors providing heat-treating services shall demonstrate compliance to Ford Manufacturing Standard **W-HTX**. Heat treating processes shall be assessed against the Ford **Heat Treat System Survey Guidelines**.

To reduce the risk of embrittlement, heat-treated steel components shall conform to the requirements of Ford Engineering Material Specification **WSS-M99A3-A**.

Process Changes and Design Changes for Supplier-Responsible Designs

For all Control Item (∇) parts and whenever a note appears on the design record, "No change without prior approval", the supplier shall obtain Ford Product Engineering approval using Form 1638, **Supplier Request for Engineering Approval**. (The form is available from Purchasing and in the **PPAP** manual.)

Supplier Notification of Control Item (∇) Requirements

When data from control charts and ES tests indicate a high degree of capability, the supplier may request a revision to the testing and inspection requirements for Control Item parts. Such revisions are effected by obtaining Ford Product Engineering and Quality approval of a revised Control Plan. Approval shall be obtained prior to implementing the change. The same approach shall be used to replace finished product inspection/testing with upstream controls.

Engineering Specification (ES) Test Performance Requirements

The goal of ES testing is to confirm that the design intent has been met. ES test failure shall be cause for the supplier to **stop production shipments immediately**, pending analysis of the process and corrective action. The supplier shall immediately notify the using Ford facility of test failure, suspension of shipments, and identification of any suspect lots shipped. After the root cause(s) of ES test failure are determined, corrected, and verified, the supplier may resume shipments. Suspect product shall not be shipped without sorting or reworking to eliminate the cause of failure.

When the root cause of test failure cannot be determined, the supplier shall immediately notify Ford Product Engineering, the responsible customer quality activity, and the using Ford facility that the product has failed an ES test but meets all other requirements. Producers shall stop production pending further instructions.

Prototype Part Quality Initiatives

When the supplier is also sourced with the production of prototypes, effective use should be made of data from prototype fabrication to plan the production process. Specific requirements and supporting data, Percent Inspection points which Satisfy Tolerance (PIST) and Percent Indices which are Process Capable (PIPC) may be required to support prototype vehicle evaluations.

QOS Assessment Guideline

Suppliers shall implement the Ford QOS methodology — a systematic, disciplined approach that uses standardized tools and practices to manage the business and achieve ever-increasing levels of customer satisfaction. See the Ford **QOS Assessment Form (dated July 12, 1996)**.

Advanced Product Quality Planning Status Reporting Guidelines, Ford Automotive Operations

Shall be used by all suppliers to Ford Motor Company. This guideline defines expectations, roles and responsibilities, and metrics for **APQP** elements. The Status Report facilitates communication between suppliers and customers, particularly when information, direction or support is required. Copies of this document can be ordered from National Reproductions Corporation - 01-248-398-7900.

Run at Rate

Is an integral part of the sample submission (PSW) for all suppliers to Ford and which provides the basis to extract capability data and inspection layout data. All production tooling shall be in place and running at full production feeds and speeds, utilizing all regular production direct and indirect personnel and support systems.

Supplier Laboratory Requirements and Calibration Services

Supplier Laboratory Requirements (4.10.6) and Calibration Services (4.11.2.b.1) are not applicable to Ford Suppliers.

Table A - Qualification of All Product Characteristics

Suppliers shall select the appropriate methods to control all dimensions and other characteristics of their products. For characteristics not controlled with SPC and not enumerated on a Control Plan, one or more of the following methods should be selected:

- Product Qualification for attributes characteristics using the tables below.
- Product audits performed on a regular basis.
- Periodic layout and laboratory tests

SAMPLE SIZE RECOMMENDATIONS FOR PRODUCT QUALIFICATION

Condition	I	II
Minimum sample per lot*	200	50
Provision to switch to the other condition:	Allowed to switch to Condition II, if, within the previous 20 consecutive lots, no sample has any nonconforming units.	Required to switch to Condition I if any sample group has any nonconforming units.

* Sample size will not change with lot size; if the lot size is equal to or smaller than the sample size, inspect 100%. A lot is not to exceed eight hours' or one day's production, whichever is smaller.

The initial application of product qualification is to use Condition I. When nonconforming units are found, the following actions are required:

PRODUCT QUALIFICATION

SAMPLE RESULTS	ACTIONS ON PROCESS	ACTIONS ON LOT
No nonconforming units	Continue to operate	Accept
One or more nonconforming units	Find root causes(s) and correct process	Sort 100% since last OK lot

Table B - Ongoing Process and Product Monitoring

The table below shall be used to make disposition on product produced by a process for which SPC is in use. After process stability has been demonstrated and capability has been calculated, the most recent point on the control chart and the historical process capability index (Cpk) shall be used to determine appropriate actions.

ONGOING PROCESS AND PRODUCT MONITORING
Control Chart Interpretation and Reaction

<table>
<tr><td rowspan="2">The <u>MOST RECENT POINT</u> indicates that the process:</td><td colspan="3">ACTIONS ON THE PROCESS OUTPUT
Based on the Historical Process Capability (Cpk)*</td></tr>
<tr><td>Less than 1.33**</td><td>1.33 - 1.67</td><td>Greater than 1.67</td></tr>
<tr><td>Is in control</td><td>100% inspect</td><td colspan="2">Accept product
Continue to reduce product variation</td></tr>
<tr><td>Has gone out of control in an adverse direction. All individuals in the sample are within specification.</td><td colspan="3">IDENTIFY AND CORRECT SPECIAL CAUSE
100% inspect | Inspect 100% since the last in- control point. | Accept product - Continue to reduce process variation.</td></tr>
<tr><td>Has gone out of control and one or more individuals in the sample are outside specification.</td><td colspan="3">IDENTIFY AND CORRECT SPECIAL CAUSE
100% inspect | 100% inspect product produced since the last in-control sample.</td></tr>
</table>

* For parts with tooling committed prior to January 1, 1990, these categories are: Cpk less than 1.0, Cpk 1.00 - 1.33, and Cpk greater than 1.33.

** Unless superseded by a Control Plan.

This table applies only when stability and capability have been demonstrated and special causes are rigorously identified and eliminated. Otherwise, the supplier shall implement 100% inspection. The table applies only to those product characteristics that are normally distributed.

Ford Glossary

Critical (∇) Characteristics

Critical (∇) characteristics are those product requirements (dimensions, performance tests) or process parameters that can affect compliance with government regulations or safe vehicle/product function, and which require specific supplier, assembly, shipping, or monitoring and are included on Control Plans.

Ongoing Process Monitoring

Refer to the tables in the Ford-specific section:

- Ongoing Process and Product Monitoring
- Qualification of all Product Characteristics

System Design Specification (SDS)

A compilation of performance metrics for a system or subsystem. Performance metrics are measurable characteristics derived from customer expectations.

Notes

General Motors-Specific Requirements

Third-Party Registration Requirements
All Production and Service Part Suppliers to General Motors, including GM Holdens, shall be third-party registered to **QS-9000** by December 31, 1997, unless otherwise specified. Suppliers to Delco Electronics shall be third-party registered to **QS-9000** by July 31, 1998. Suppliers to GM Asia Pacific Operations (APO), except GM Holdens in Australia, shall be third-party registered to **QS-9000** by December 31, 1999. New supplier locations shall be **QS-9000** registered prior to shipment of product.

General Procedures And Other Requirements
The GM North American publications listed below contain additional requirements or guidelines which shall be met, if applicable, by GM North American Operations (NAO) suppliers. Specific questions on the content of these publications should be directed to the appropriate contact at the GM procuring division. Information on the latest revision dates for these publications and ordering information can be obtained by calling Boise Cascade Office Products at 01-810-758-5400 (U.S. Only: 1-800-421-7676).

NAO Suppliers shall verify that they are using the latest version of these documents at least annually.

- **C4 Technology Program, GM - Supplier C4 Information,** (GM1825).
  - Assists suppliers in understanding and executing GM's C4 strategy.
  - Provides Year 2000 readiness information

- **Key Characteristics Designation System,** (GM 1805 QN)
  - Defines GM's approach to "special" characteristics.

- **Supplier Submission of Material for Process Approval** (GP-4), (GM1407).
  - Shipping procedure for all pilot parts.

- **Supplier Quality Processes and Measurements Procedure** (GP-5), (GM 1746).

- **Supplier Submission of Match Check Material** (GP-6), (GM1689).
  - Notification by purchasing division if required.

- **Component Verification & Traceability Procedure** (GP-7), (GM1730).

- **Continuous Improvement Procedure** (GP-8), (GM1747).
  - Required of all suppliers; replaces part certification procedure.

- **Run at Rate** (GP-9), (GM1960)
  - Required for all new parts; physical verification that the production process is capable of producing quality products at quoted rates.

- **Evaluation and Accreditation of Supplier Test Facilities** (GP-10), (GM1796).
  - Third party registration to **QS-9000** in accordance with Appendix B will satisfy the GP-10 requirements for GM North American locations of laboratory facilities utilized by the suppliers for inspection and testing of their own product for purposes of conformance to the specified requirements. Laboratories utilized for commercial laboratory services are excluded from this provision. See Supplier Laboratory Requirements 4.10.6 and Accredited Laboratories 4.10.7. Some GM divisions may require laboratory accreditation of supplier laboratory facilities.

- **Early Production Containment Procedure** (GP-12), (GM1920).
  - Required of all parts requiring production approval

- **Traceability Identifier Requirements for Selected Components on Passenger and Light Truck Vehicles - Traceability Identifier Requirement** (TIR 15-300), (GM1731).

- **Specifications for Part and Component Bar Codes ECV/VCVS**, (GM 1737).

- **Procedure for Suppliers of Material for Pre-Prototype and Prototype Sample Approval** (GP-11), (GM1820).
  - Required for all prototype parts.

- **Packaging and Identification Requirements for Production Parts** (GM 1738)

- **Shipping/Parts Identification Label Standard** (GM 1724)
  - This GM standard was developed in conjunction with the **AIAG Trading Partner Labels Guideline B10**. GM variations on and additions to the AIAG standard are noted.

- **Shipping and Delivery Performance Requirements** (GM 1797)

- **All GM-specific requirements** (GM 9000), referenced in this section of the **QS-9000**, now available from Boise Cascade Office Products at 01-810-758-5400 (U.S. Only: 1-800-421-7676).

QS-9000 Applicability
QS-9000 applies to all contracted GM suppliers (see Glossary).

UPC Labeling For Commercial Service Applications
GM Service Parts Operations (SPO) requires use of UPC labeling for certain commercial applications rather than AIAG labeling. Contact your SPO buyer for instructions.

Layout Inspection and Functional Test
Unless specified otherwise by a GM procuring division, there is no customer established frequency for layout inspection after receiving Production Part Approval (PPAP). Reference is made to Element 4.10.4.1 requirements.

Customer Signature on Control Plan
General Motors does not provide waivers to suppliers for control plan approval because General Motors signatures on the Control Plan are not required.

GM Holdens-Specific Requirements
The following additional documents are required for suppliers to GM Holdens in Australia:

- **Pre-Production/Pilot Material GP4 Supplement** (SGP04), February, 1996
- **Breakpoint Identification & Procedure** (SPB01), February, 1996

PPAP
Suppliers to General Motors shall use the **Production Part Approval Process (PPAP)** with subcontractors (see Glossary).

Year 2000 Supplier Readiness
The supplier shall have a timed action plan to address the Year 2000 software/hardware date code issue prior to the advent of the year 2000. This plan shall address Year 2000 readiness of the supplier's products, business operating systems (including Electronic Data Interchange), subcontractors, and provide for both individual unit and enterprise testing of all solutions or remediations made. This action plan shall be made available to the customer or the customer's agent upon request. For more information, see http://www.aiag.org and the **C4 Technology Program, GM - Supplier C4 Information,** (GM1825).

Electronic Communication - 4.15.6.3

NOTE: Examples of such systems for suppliers to GM's North American Operations are: 1) requirement planning information such as the Electronic Data Interchange (EDI) ANSI ASC X12 830 transaction set or the EDIFACT DELFOR message, and 2) ship schedules such as the ANSI ASC X12 862 or 866 transaction sets or the EDIFACT DELJIT message.

Shipment Notification System - 4.15.6.4

NOTE: Examples of such systems for suppliers to GM's North American Operations are: 1) the ANSI ASC X12 856 transaction set, or 2) the EDIFACT DESADV message.

For EDI assistance, contact 01-810-947-5566. For EDIFACT assistance, and confirmation of the required implementation date for a supplier, contact 01-248-265-9907.

Other OEM-Specific Requirements

The companies below have adopted **QS-9000** as their supplier quality system requirements or have recognized **QS-9000** registration or compliance as also meeting their company-specific supplier quality system requirements.

Mack Trucks, Inc.
Navistar International Transportation Corp.
PACCAR Inc
Volvo Truck North America
Mitsubishi Motors - Australia
Toyota Australia

Additional requirements for the above OEMs are available in their respective publications as listed below.

Mack Trucks Supplier Quality Requirements
Navistar Quality Requirements (NQR)
PACCAR Supplier Quality Standard
PACCAR Supplier Packaging Guidelines
Toyota Australia - Toyota Quality System (6S) Manual
Volvo Standards Manual

For further information, contact the OEM's Purchasing Department.

Appendix A:

Implementation of the QS-9000 System

Overview

The quality system assessment process is used to determine if a supplier's quality system meets the requirements of this document. The process has been designed to provide this determination with minimal impact on the supplier's operations.

Alternative Method for Verifying Supplier Conformance

The customer shall determine the method for verification of conformance to **QS-9000**. The alternatives are:

- Second party (customer) assessment - refer to **QSA**.
- Third party (quality system certification body/registrar) assessment and registration (see Appendix I).

The Customer's Decision Process

The customer may request from the supplier one or more of the following according to that customer's requirements:

- The supplier's quality manual (level 1 documentation)
- Supporting procedures (level 2 documentation)
- A self-assessment using the **QSA** as requested by the customer
- Internal audit results
- A plan with timing showing the supplier's process to obtain third party registration to **QS-9000** (see Appendix B).
- A copy of the accredited third party certification body/registrar's certificate citing conformance to **QS-9000** and the certification body/registrar's reports.

Upon receipt of the above input(s), the customer prioritizes supplier on-site audits using the following criteria:

- Is the quality of the product provided satisfactory?
- Has the supplier received **QS-9000** registration from a nationally-accredited certification body/registrar (see Appendix B)?
- Is the scope of the **QS-9000** registration appropriate for the product being supplied and does it include the appropriate ISO standard (9001 or 9002)?

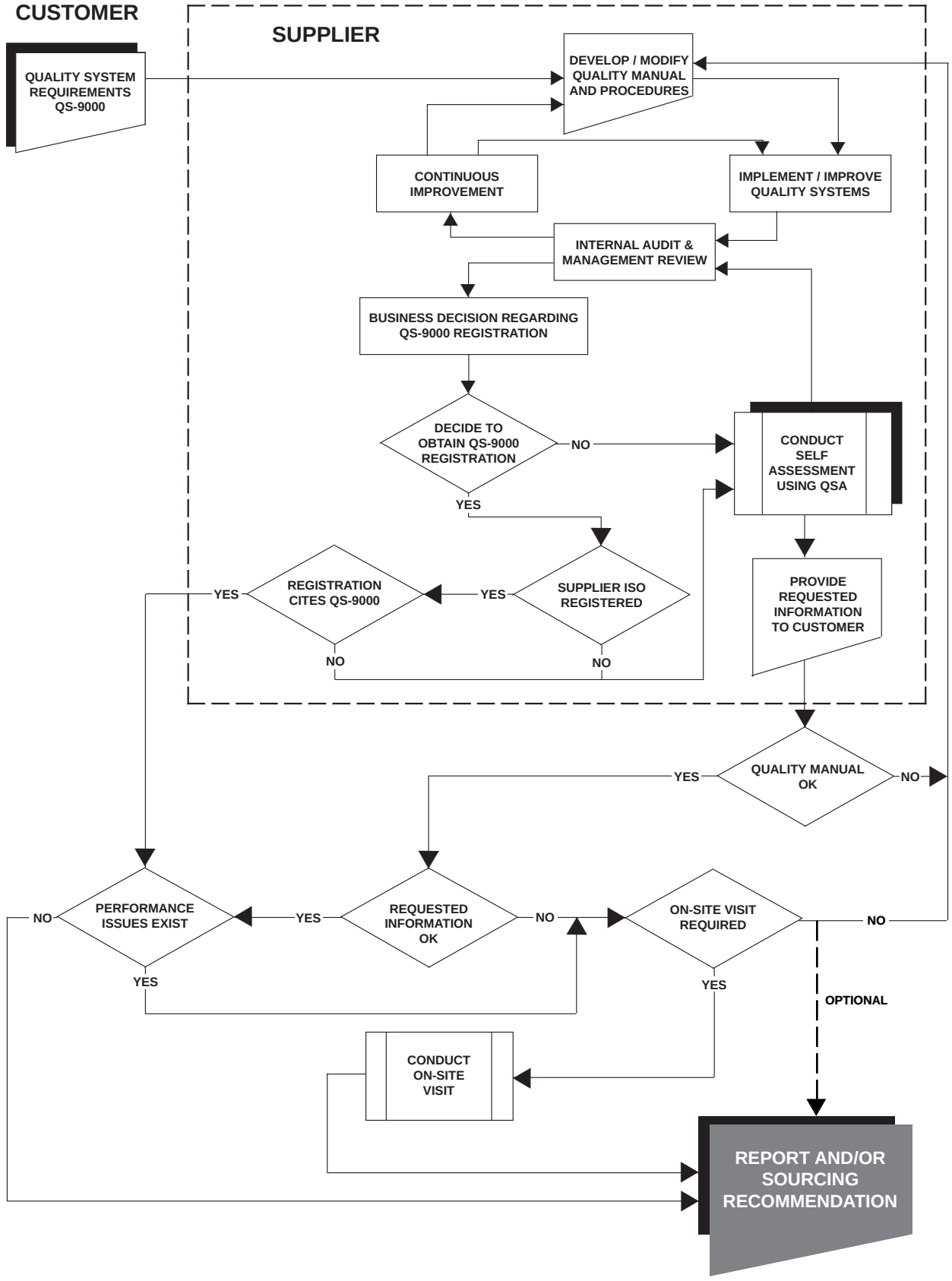
If any of the above are "no", then:

- Does the quality manual comply with **QS-9000**?
- Does the supplier's self-assessment using the **QSA** verify conformance of the supplier's quality system to **QS-9000** requirements?

Generally, suppliers whose product and service quality meets customer requirements and who have third party **QS-9000** registration will not receive redundant audits. Suppliers whose product or service quality fails to meet the customer's continuous improvement objectives will receive a high priority for an on-site visit, for either problem-solving or audit.

Assessments by a customer are not equivalent to **QS-9000** registration and have no implied reciprocal recognition by other customers.

> **NOTE:** Overall supplier ratings are outside the scope of this document and will be handled separately by each customer.


CUSTOMER
SUPPLIER
QUALITY SYSTEM REQUIREMENTS QS-9000
DEVELOP / MODIFY QUALITY MANUAL AND PROCEDURES
CONTINUOUS IMPROVEMENT
IMPLEMENT / IMPROVE QUALITY SYSTEMS
INTERNAL AUDIT & MANAGEMENT REVIEW
BUSINESS DECISION REGARDING QS-9000 REGISTRATION
DECIDE TO OBTAIN QS-9000 REGISTRATION
NO
YES
CONDUCT SELF ASSESSMENT USING QSA
PROVIDE REQUESTED INFORMATION TO CUSTOMER
SUPPLIER ISO REGISTERED
YES
NO
REGISTRATION CITES QS-9000
YES
NO
QUALITY MANUAL OK
YES
NO
ON-SITE VISIT REQUIRED
NO
YES
OPTIONAL
REQUESTED INFORMATION OK
NO
YES
PERFORMANCE ISSUES EXIST
NO
YES
CONDUCT ON-SITE VISIT
REPORT AND/OR SOURCING RECOMMENDATION

Notes

Appendix B:

Code of Practice for Quality System Certification Bodies/Registrars

1. The certification body/registrar's office which issues the ISO 9000 certificate citing **QS-9000** compliance shall be accredited by a customer-recognized national accreditation body. Memoranda of Understanding (MOUs) are not acceptable for meeting this requirement. The certification body/registrar's scope of accreditation shall include the commodities being assessed. The scope of registration shall include all products and services being supplied to one or more of the companies subscribing to this document.

2. **QS-9000** is a contractual requirement for all supplier sites of: a) production materials, b) production or service parts, or c) heat treating, plating , painting or other finishing services directly to the companies using **QS-9000**. The registration process shall encompass all **QS-9000** requirements.

3. The assessment shall include all elements of the supplier's quality system implemented to meet automotive customer needs of those companies requiring **QS-9000** compliance/registration of their suppliers, even when these elements go beyond **QS-9000**.

4. The assessment shall include evaluation of all supplier quality system elements for *effective implementation of* **QS-9000** *requirements* as well as for *effectiveness in practice*. Part of the evidence required is the result of at least one complete internal audit and management review cycle.

5. Certification bodies/registrars shall conform to ISO/IEC Guide 62:1996 (E), General requirements for bodies operating assessment and certification/ registration of quality systems, and the IAF Guidance on the Application of ISO/IEC Guide 62:1996, issue 1, 2 June, 1997, where not otherwise indicated in this Code of Practice and Appendices H & I.

6. Each on-site audit shall include a review of:
   - Customer complaints and supplier response
   - Supplier internal audit and management review results and actions
   - Progress made toward continuous improvement targets

7. The entire quality system shall be assessed at a minimum of once every three years. Each supplier design and manufacturing location shall be individually audited and referenced on a certificate. It is permissible for each surveillance audit to re-examine part of the system so that the equivalent of a total reassessment is completed within each three year cycle. Also, each such location shall receive a surveillance audit at least once in every consecutive twelve month period in accordance with Appendix H requirements. The last surveillance audit in each three year period may or may not be a complete system assessment. The Audit Report shall clearly show the part of the system that was audited on each surveillance visit.

8. The audit team shall provide a full report on the operation audited consistent with the content of Model B of the current RvA publication, Guideline for Compiling Reports on Quality System Audits, to the supplier within forty-five days of each initial and surveillance (partial) audit unless otherwise agreed by the supplier. Model B report format is preferred. Third party auditors shall identify opportunities for improvement (e.g. excessive scrap) as these become evident during the audit without recommending specific solutions. These opportunities shall be included in the report to the supplier.

9. Organizations that have provided quality system consulting (see Glossary) services in the past two years to a particular client are not acceptable as certification bodies/registrars for that client, nor may they supply auditors. This restriction includes subsidiaries or affiliates of the same parent company.

10. All **QS-9000** audit teams (including surveillance) shall satisfy the following:
    - all members of the audit team shall be recognized and qualified as ISO 9000 auditors (which does not include "Provisional" auditors) per the accreditation body's criteria,
    - all members of the audit team shall have satisfactorily completed (and passed the exam) the required certification body/registrar auditor training courses that have been approved by the companies issuing this document,
    - one member shall have sector specific experience (SIC or other recognized code), and
    - one member shall have relevant experience in the automotive industry as defined by the relevant accreditation body.

    Where more than one visit is required for a registration audit, at least one member of the audit team shall participate in all visits (see Appendix H, Table B). Also, a majority of those responsible for making certification decisions, or at least one with veto power (refer to Appendix G, paragraph A.5), shall satisfactorily complete the required certification body/registrar auditor training courses that have been approved by the companies issuing this document. Satisfactory completion will be indicated by a certificate.

11. Quality system consultants to the supplier, if present during the assessment, are limited to the role of observer.

12. Certification body/registrar's checklists shall include, but not be limited to, all single asterisk (*) and double asterisk (**) questions contained in the **QSA** Second Edition. Quality systems shall not be registered to **QS-9000** if "open" major or minor nonconformances, as defined in the **QSA**, exist.

13. Chrysler, Ford and General Motors do not accept a third party assessment which does not meet the specified **QS-9000** requirements. Alternate routes (see IAF 98 020, dated January 21, 1998, "An Alternative Method for Maintaining ISO 9001/2/3 Certification/Registration") are not acceptable for **obtaining** ISO 9000 registration for use in **QS-9000** registration, or for maintenance of **QS-9000** registration.

Certification bodies/registrars who:

- Contract with a supplier to comply with Appendices B, G, H, I, and any **IASG Sanctioned QS-9000 Interpretations** subsequently issued, and
- Are accredited by an OEM-recognized accreditation body, and
- Are qualified by the accreditation body (referenced above) to conduct **QS-9000** registrations

are authorized to cite conformance to **QS-9000** on ISO 9001 or ISO 9002 certificates.

Instructions to Suppliers Concerning Third Party Registration

Suppliers shall review the Code of Practice with potential certification bodies/registrars during the negotiation process to ensure that the resulting contract specifies compliance with the Code of Practice.

Suppliers registered to an ISO 9000 standard without consideration of **QS-9000** requirements shall contact their certification body/registrar and indicate that their customer(s) require(s) inclusion of **QS-9000** in the registration process. The supplier shall update the quality system documentation as necessary to meet **QS-9000** and identify these revisions to the certification body/registrar at the next surveillance visit. When conformance to **QS-9000** has been verified (acceptance of satisfactory evidence of resolution of all major/minor nonconformities), the certification body/registrar will issue a certificate citing conformance to **QS-9000**. Supplier reference to **QS-9000** registration may be made only after receipt of the **QS-9000** certificate.

Only registration certificates citing conformance to **QS-9000** will be acceptable to the companies using this document.

Suppliers shall permit the certification body/registrar's audit team to be accompanied by representatives from a witnessing accreditation body, and Chrysler, Ford, or General Motors Supplier Quality Requirements Task Force representatives or their designees, without objection or a requirement for prior notice.

The certification body/registrar's reports shall be made available to customers upon request.

Suppliers preparing for conformance to ISO 9001:1994 (or ISO 9002:1994) should obtain from the ISO member in their country the set of relevant ISO standards and in particular ISO 9000-1:1994 and ISO 9004-1:1994 as these are necessary for third party registration. (Reference Appendix D).

Appendix C:

Standard Characteristics

	GENERAL MOTORS NAO	FORD MOTOR CO.	CHRYSLER
Definition: Non-Key Characteristic	Is a product characteristic for which reasonably anticipated variation is unlikely to significantly affect a product's safety, compliance with governmental regulations, fit/function.	NOT USED	NOT USED
Nomenclature Symbol	STANDARD NONE		

Special Characteristics and Symbols

Definition: Key Characteristic (Not Relating to Safety or Legal Considerations)	A product characteristic for which reasonably anticipated variation is likely to significantly affect customer satisfaction with a product (other than S/C) such as its fits, function, mounting or appearance, or the ability to process or build the product.	Are those product, process, and test requirements that are important to customer satisfaction and for which quality planning actions shall be included in the Control Plan.	Identifies a Key Quality Characteristic of a part, system, process or test specification that is sensitive to variation with the potential of degrading customer satisfaction. For all Diamond designated characteristics a process control plan is required.
Nomenclature Symbol	FIT/FUNCTION - <F/F> ◊	SIGNIFICANT CHARACTERISTIC - SC **NONE**	KEY QUALITY CHARACTERISTIC DIAMOND - <D> ◊
Definition: Key Characteristic (With Safety or Legal Consideration)	Is a product characteristic for which reasonably anticipated variation could significantly affect the product's safety or its compliance with government regulations (such as: flammability, occupant protection, steering control, braking, etc. . . .), emissions, noise, radio frequency interference, etc. . . .	Are those product requirements (Dimensions, Specifications Tests) or process parameters which can affect compliance with government regulations or safe Vehicle/Product Function and which require specific producer, assembly, shipping or monitoring actions and inclusion on the Control Plan.	Safety characteristics are defined as engineering designated specifications or product requirements applicable to component material, assembly operation (s) which require special manufacturing control to assure compliance with governmental vehicle safety, emissions, noise, or theft prevention requirements.
Nomenclature Symbol	SAFETY/COMPLIANCE <S/C> Ⓥ	CRITICAL CHARACTERISTIC - CC ∇	SHIELD - <S> ⛉

Supplier symbol equivalencies for Special Characteristics are only acceptable to Chrysler Corporation (see 4.2.3.2 and 4.9.d.1).

Appendix D:

Local Equivalents for ISO 9001 and 9002 Specifications

COUNTRY	ISO 9001	ISO 9002
Argentina	IRAM-IACC-ISO E-9001:1994	IRAM-IACC-ISO E-9002:1994
Australia	AS/NZS ISO 9001:1994	AS/NZS ISO 9002:1994
Belgium	NBN-EN ISO 9001:1994	NBN-EN ISO 9002:1994
Brazil	NBR ISO 9001:1994	NBR ISO 9002:1994
Canada	CAN/CSA-ISO 9001-94	CAN/CSA-ISO 9002-94
France	NF EN ISO 9001	NF EN ISO 9002
Germany	DIN EN ISO 9001	DIN EN ISO 9002
Ireland	I.S. EN ISO 9001:1994	I.S. EN ISO 9002:1994
Italy	UNI EN ISO 9001	UNI EN ISO 9002
Mexico	NOM-CC-3	NOM-CC-4
New Zealand	AS/NZS ISO 9001:1994	AS/NZS ISO 9002:1994
South Africa	SABS-ISO 9001:1994	SABS-ISO 9002:1994
Spain	UNE-EM-ISO 9001:1994	UNE-EM-ISO 9002:1994
United Kingdom	BS EN ISO 9001:1994	BS EN ISO 9002:1994
United States	ANSI/ASQC Q9001-1994	ANSI/ASQC Q9002-1994
Venezuela	COVENIN-ISO 9001:1995	COVENIN-ISO 9002:1995

For Information and Copies of the Local Equivalents for ISO 9001 and 9002 Contact the Following:

ARGENTINA/ARGENTINE (IRAM)

Instituto Argentino de Normalización
Chile 1192
1098 BUENOS AIRES

Argentine

General Director: Mr. José Francisco López

Tel. + 54 1 383 37 51
Fax + 54 1 383 84 63
Internet postmaster@iram.org.ar

AUSTRALIA/AUSTRALIE (SAA)

Standards Australia
1 The Crescent
HOMEBUSH - N.S.W. 2140

Postal address/Adresse postale

P.O. Box 1055
STRATHFIELD - N.S.W. 2135

Australie

Chief Executive: Mr. Ross Wraight

Tel. + 61 2 9746 47 00
Fax + 61 2 9746 84 50
Telex 2 65 14 astan aa
Internet intsect@saa.sa.telememo.au
X.400 s=intsect; o=saa; p=sa; a= telememo; c=au

AUSTRIA/AUTRICHE (ON)

Österreichisches Normungsinstitut
Heinestrasse 38
Postfach 130
A-1021 WIEN

Managing Director: Dr. Gerhard Hartmann

Tel. + 43 1 213 00
Fax + 43 1 213 00 650
X.400 c=at; a=ada; p=telebox; o=on; s=iro
Internet iro@tbxa.telecom.at

BELGIUM/BELGIQUE (IBN)

Institut belge de normalisation
Av. de la Brabançonne 29
B-1000 BRUXELLES

Directeur général: M. P. Croon

Tel. + 32 2 738 01 11
Fax + 32 2 733 42 64
Internet croon@ibn.be

BRAZIL/BRÉSIL (ABNT)

Associação Brasileira de Normas Técnicas
Av. 13 de Maio, n° 13, 28° andar
20003-900 - RIO DE JANEIRO-RJ

Brésil

General Director: Mr. Antonio Marcio Avellar

Tel. + 55 21 210 31 22
Fax + 55 21 532 21 43
Telex 213 43 33 abnt br
Telegram normatécnica rio
Internet abnt@embratel.net.br
X.400 c=br; a=embratel; o=abnt; ou=dg; s=avellar; g=marcio

BULGARIA/BULGARIE (BDS)

Committee for Standardization and Metrology
21, 6th September Str.
1000 SOFIA

Bulgarie

President: Mr. Stanislav Shurulinkov

Tel. + 359 2 85 91
Fax + 359 2 80 14 02
Telex 2 25 70 dks bg

CANADA (SCC)

Standards Council of Canada
45 O'Connor Street, Suite 1200
OTTAWA, Ontario K1P 6N7

Canada

Executive Director: Mr. Michael B. McSweeney

Tel. + 1 613 238 32 22
Fax + 1 613 995 45 64
Internet info@scc.ca

CHILE/CHILI (INN)

Instituto Nacional de Normalización
Matías Cousiño 64 - 6° piso
Casilla 995 - Correo Central
SANTIAGO

Chili

Executive Director: Mr. Lee Ward

Tel. + 56 2 696 81 44
Fax + 56 2 696 08 74
Telegram inn
Internet inn@huelen.reuna.cl

CHINA/CHINE (CSBTS)

China State Bureau of Technical Supervision
4, Zhichun Road
Haidian District
P.O. Box 8010
BEIJING 100088

Chine

Director General: Mr. Li Chuanqing

Tel. + 86 10 6 203 24 24
Fax + 86 10 6 203 10 10
Telegram 1918 beijing

COLOMBIA/COLOMBIE (ICONTEC)

Instituto Colombiano de Normas Técnicas y Certificación
Carrera 37 52-95
Edificio ICONTEC
P.O. Box 14237
SANTAFÉ DE BOGOTÁ

Colombie

Director Ejecutivo: Mr. Fabio Tobón Londoño

Tel. + 57 1 315 03 77
Fax + 57 1 222 14 35
Telex 4 25 00 icont co
Telegram icontec
Internet sicontec@col1.telecom.com.co

CROATIA/CROATIE (DZNM)

State Office for Standardization and Metrology
Ulica grada Vukovara 78
10 000 ZAGREB

Croatie

Director General: Dr. Jakv́a Topic

Tel. + 385 1 53 99 34
Fax + 385 1 53 65 98

CZECH REPUBLIC/TCHÈQUE, RÉPUBLIQUE (COSMT)

Czech Office for Standards, Metrology and Testing
Biskupský dvúr 5
110 02 PRAHA 1

Tchèque, République

President: Vacant

Tel. + 420 2 232 44 30
Fax + 420 2 232 43 73
Telex 12 19 48 funm c
Telegram normalizace praha

DENMARK/DANEMARK (DS)

Dansk Standard
Kollegievej 6
DK-2920 CHARLOTTENLUND

Managing Director: Mr. Jacob E. Holmblad

Tel. + 45 39 96 61 01
Fax + 45 39 96 61 02
Internet dansk.standard@ds.dk

EGYPT/ÉGYPTE (EOS)

Egyptian Organization for Standardization and Quality Control
2 Latin America Street
Garden City
CAIRO

Égypte

President: Dr. Abdel Baset El-Sebai

Tel. + 20 2 354 97 20
Fax + 20 2 355 78 41
Telex 9 32 96 eos un
Telegram tawhid
Internet moi@idsc.gov.eg

FINLAND/FINLANDE (SFS)

Finnish Standards Association SFS
P.O. Box 116
FIN-00241 HELSINKI

Managing Director: Mr. Kari Kaartama

Tel. + 358 9 149 93 31
Fax + 358 9 146 49 25
Internet sfs@sfs.fi
X.400 g=[givenname]; s=[surname]; o=sfs; p=inet; a=mailnet; c=fi

FRANCE (AFNOR)

Association française de normalisation
Tour Europe
F-92049 PARIS LA DÉFENSE CEDEX

Directeur général: M. Bernard Vaucelle

Tel. + 33 1 42 91 55 55
Fax + 33 1 42 91 56 56
Telex 61 19 74 afnor f
Telegram afnor courbevoie

GERMANY/ALLEMAGNE (DIN)

DIN Deutsches Institut für Normung
Burggrafenstrasse 6
D-10787 BERLIN

Postal address/Adresse postale

D-10772 BERLIN

Director: Prof. Dr. H. Reihlen

Tel. + 49 30 26 01-0
Fax + 49 30 26 01 12 31
Telex 18 42 73 din d
Telegram deutschnormen berlin
Internet postmaster@din.de
X.400 c=de; a=d400; p=din; s=postmaster

GREECE/GRÈCE (ELOT)

Hellenic Organization for Standardization
313, Acharnon Street
GR-111 45 ATHENS

Managing Director: Dr. P. Theofanopoulos

Tel. + 30 1 228 00 01
Fax + 30 1 228 30 34
Telex 21 96 21 elot gr
Telegram elotyp-athens
Internet elotinfo@elot.gr

HUNGARY/HONGRIE (MSZT)

Magyar Szabványügyi Testület
Üllöi út 25
H-1450 BUDAPEST 9
Pf. 24.

General Director: Mr. György Pónyai

Tel. + 36 1 218 30 11
Fax + 36 1 218 51 25
Internet sze1545@helka.iif.hu

ICELAND/ISLANDE (STRI)

Icelandic Council for Standardization
Keldnaholt
IS-112 REYKJAVIK

Secretary General: Mr. J. Thorsteinsson

Tel. + 354 570 71 50
Fax + 354 570 71 11
Internet stri@stri.is

INDIA/INDE (BIS)

Bureau of Indian Standards
Manak Bhavan
9 Bahadur Shah Zafar Marg
NEW DELHI 110002

Inde

Director General: Mr. P.S. Das

Tel. + 91 11 323 79 91
Fax + 91 11 323 40 62
Telex 316 58 70 bis in
Telegram manaksanstha
Internet bisind@del2.vsnl.net.in

INDONESIA/INDONÉSIE (DSN)

Dewan Standardisasi Nasional - DSN
(Standardization Council of Indonesia)
c/o Pusat Standardisasi - LIPI
Jalan Jend. Gatot Subroto 10
JAKARTA 12710

Indonésie

Chairman: Dr. B.J. Habibie

Tel. + 62 21 522 16 86
Fax + 62 21 520 65 74
Telex 6 28 75 pdii ia
Telegram lipi jakarta
Internet pustan@rad.net.id

IRAN, ISLAMIC REPUBLIC OF/IRAN, RÉPUBLIQUE ISLAMIQUE D' (ISIRI)

Institute of Standards and Industrial Research of Iran
P.O. Box 31585-163
KARAJ

Iran, République islamique d'

President: Mr. Mir Ahmad Sadat

Tel. + 98 261 22 60 31-5
Fax + 98 261 22 50 15
Telex 21 54 42 stan ir
Telegram standinst

IRELAND/IRLANDE (NSAI)

National Standards Authority of Ireland
Glasnevin
DUBLIN-9

Irlande

Director: Mr. E. Paterson

Tel. + 353 1 807 38 00
Fax + 353 1 807 38 38
Telegram research, dublin
Internet nsai@nsai.ie

ISRAEL/ISRAËL (SII)

Standards Institution of Israel
42 Chaim Levanon Street
TEL AVIV 69977

Israël

Director General: Mrs. Ziva Patir

Tel. + 972 3 646 51 54
Fax + 972 3 641 96 83
Internet standard@netvision.net.il

ITALY/ITALIE (UNI)

Ente Nazionale Italiano di Unificazione
Via Battistotti Sassi 11/b
I-20133 MILANO

Vice-Président: M. Enrico Martinotti

Tel. + 39 2 70 02 41
Fax + 39 2 70 10 61 06
Telegram unificazione
Internet webmaster@uni.unicei.it

JAPAN/JAPON (JISC)

Japanese Industrial Standards Committee
c/o Standards Department
Agency of Industrial Science and Technology
Ministry of International Trade and Industry
1-3-1, Kasumigaseki, Chiyoda-ku
TOKYO 100

Japon

President: Mr. Shoichi Saba

Tel. + 81 3 35 01 20 96
Fax + 81 3 35 80 86 37

KENYA (KEBS)

Kenya Bureau of Standards
Off Mombasa Road
Behind Belle Vue Cinema
P.O. Box 54974
NAIROBI

Kenya

Managing Director: Mr. P.O. Okundi

Tel. + 254 2 50 22 10/19
Fax + 254 2 50 32 93
Telex 2 52 52 viwango
Telegram kenstand
Internet kebs@arso.gn.apc.org

KOREA, DEMOCRATIC PEOPLE'S REPUBLIC OF/CORÉE, RÉPUBLIQUE POPULAIRE DÉMOCRATIQUE DE (CSK)

Committee for Standardization of the Democratic People's Republic of Korea
Zung Gu Yok Seungli-Street
PYONGYANG

Corée, Rép. p. dém. de

President: Mr. Ryo Song Gyun

Tel. + 85 02 57 15 76
Telex 59 72 tech kp
Telegram standard

KOREA, REPUBLIC OF/CORÉE, RÉPUBLIQUE DE (KNITQ)

Korean National Institute of Technology and Quality (KNITQ)
1599 Kwanyang-dong
Dongan-ku, Anyang-city
KYONGGI-DO 430-060

Corée, République de

Director-General: Mr. Seung-Bae Lee

Tel. + 82 3 43 84 18 61
Fax + 82 3 43 84 60 77

MALAYSIA/MALAISIE (DSM)

Department of Standards Malaysia (DSM)
21st Floor, Wisma MPSA
Persiaran Perbandaran
40675 Shah Alam
SELANGOR DARUL EHSAN

Malaisie

Director-General: Mr. A. Aziz Mat

Tel. + 60 3 559 80 33
Fax + 60 3 559 24 97
Internet central@dsm4.gov.my

MEXICO/MEXIQUE (DGN)

Dirección General de Normas
Calle Puente de Tecamachalco N° 6
Lomas de Tecamachalco
Sección Fuentes
Naucalpan de Juárez
53 950 MEXICO

Mexique

Director General: Mrs. Carmen Quintanilla Madero

Tel. + 52 5 729 93 00
Fax + 52 5 729 94 84
Telex 177 58 40 imceme
Telegram secofi/147
Internet cidgn@secofi.gob.mx

MOROCCO/MAROC (SNIMA)

Service de normalisation industrielle marocaine
Ministère du commerce, de l'industrie et l'artisanat
Quartier administratif
RABAT CHELLAH

Maroc

Chef exécutif: M. Abdellah Nejjar

Tel. + 212 7 76 37 33
Fax + 212 7 76 62 96
Telex 36 872

NETHERLANDS/PAYS-BAS (NNI)

Nederlands Normalisatie-instituut
Kalfjeslaan 2
P.O. Box 5059
NL-2600 GB DELFT

Director General: Dr. C. de Visser

Tel. + 31 15 2 69 03 90
Fax + 31 15 2 69 01 90
Telex 3 81 44 nni nl
Telegram normalisatie delft
Internet info@nni.nl
X.400 c=nl; a=400net; p=nni; o=nni; s=[surname]; g=[givenname]

**NEW ZEALAND/
NOUVELLE-ZÉLANDE (SNZ)**

Standards New Zealand
Radio New Zealand House
155 The Terrace
WELLINGTON 6001

Postal address/Adresse postale

Private Bag 2439
WELLINGTON 6020

Nouvelle-Zélande

Chief Executive: Dr. Kaye McAulay

Tel. + 64 4 498 59 90
Fax + 64 4 498 59 94
Internet snz@standards.synet.net.nz

NORWAY/NORVÈGE (NSF)

Norges Standardiseringsforbund
Drammensveien 145 A
Postboks 353 Skøyen
N-0212 OSLO

Director: Mr. Ivar Jachwitz

Tel. + 47 22 04 92 00
Fax + 47 22 04 92 11
Internet firmapost@nsf.telemax.no
X.400 s=firmapost; p=nsf; a=telemax; c=no

PHILIPPINES (BPS)

Bureau of Product Standards
Department of Trade and Industry
361 Sen. Gil J. Puyat Avenue
Makati
METRO MANILA 1200

Philippines

Director: Mr. Jesus L. Motoomull

Tel. + 63 2 890 49 65
Fax + 63 2 890 49 26
Internet dtibpsrp@sequel.net

POLAND/POLOGNE (PKN)

Polish Committee for Standardization
ul. Elektoralna 2
P.O. Box 411
00-950 WARSZAWA

Pologne

President: Mr. Marian Lukaszewicz

Tel. + 48 22 620 54 34
Fax + 48 22 620 54 34

PORTUGAL (IPQ)

Instituto Português da Qualidade
Rua C à Avenida dos Três Vales
P-2825 MONTE DE CAPARICA

Président: M. Cândido dos Santos

Tel. + 351 1 294 81 00
Fax + 351 1 294 81 01
X.400 c=pt; a=mailpac; p=gtw-ms; o=ipq; ou1=i qm; s=ipqmail
Internet ipqmail@ipqm.ipqgtw-ms.mailpac.pt

ROMANIA/ROUMANIE (IRS)

Institutul Român de Standardizare
Str. Jean-Louis Calderon Nr. 13
Cod 70201
BUCURESTI 2

Roumanie

Director General: Mr. Mircea Martis

Tel. + 40 1 211 32 96
Fax + 40 1 210 08 33

RUSSIAN FEDERATION/RUSSIE, FÉDÉRATION DE (GOST R)

Committee of the Russian Federation for Standardization, Metrology and Certification
Leninsky Prospekt 9
MOSKVA 117049

Russie, Fédération de

President: Prof. Dr. Gennady P. Voronin

Tel. + 7 095 236 40 44
Fax + 7 095 237 60 32
Telex 41 13 78 gost su
Telegram moskva standart
Internet gosstandart@sovcust.sprint.com

SAUDI ARABIA/ARABIE SAOUDITE (SASO)

Saudi Arabian Standards Organization
Imam Saud Bin Abdul Aziz Bin Mohammed Road (West End)
P.O. Box 3437
RIYADH 11471

Arabie Saoudite

Director General: Dr. Khaled Y. Al-Khalaf

Tel. + 966 1 452 00 00
Fax + 966 1 452 00 86
Telex 40 16 10 saso sj
Telegram giasy

SINGAPORE/SINGAPOUR (PSB)

Singapore Productivity and Standards Board (PSB)
1 Science Park Drive
SINGAPORE 118221

Singapour

Chief Executive: Mr. Lee Suan Hiang

Tel. + 65 278 66 66
Fax + 65 776 12 80

SLOVAKIA/SLOVAQUIE (UNMS)

Slovak Office of Standards, Metrology and Testing
Štefanovicova 3
814 39 BRATISLAVA

Slovaquie

President: Mr. Lubomír Šutek

Tel. + 42 17 39 10 85
Fax + 42 17 39 10 50

SLOVENIA/SLOVÉNIE (SMIS)

Standards and Metrology Institute
Ministry of Science and Technology
Kotnikova 6
SI-1000 LJUBLJANA

Director: Dr. Bogdan Topic

Tel. + 386 61 178 30 00
Fax + 386 61 178 31 96
Internet smis@usm.mzt.si
X.400 s=smis; u=usm; o=mzt; p=ac; a=mail; c=si

SOUTH AFRICA/AFRIQUE DU SUD (SABS)

South African Bureau of Standards
1 Dr Lategan Rd, Groenkloof
Private Bag X191
PRETORIA 0001

Afrique du Sud

Acting President: Mr. Martin Kellermann

Tel. + 27 12 428 79 11
Fax + 27 12 344 15 68
Telex 32 13 08 sa
Telegram comparator
Internet postmaster@sabs.co.za
X.400 c=za; a=telekom 400; o=south african bureau of standards; s=sabs

SPAIN/ESPAGNE (AENOR)

Asociación Española de Normalización y Certificación
Génova, 6
E-28004 MADRID

Director General: Mr. Ramón Naz

Tel. + 34 1 432 60 00
Fax + 34 1 310 49 76
Telegram aenor

SWEDEN/SUÈDE (SIS)

SIS - Standardiseringen i Sverige
St Eriksgatan 115
Box 6455
S-113 82 STOCKHOLM

Director: Mr. Svante Lundin

Tel. + 46 8 610 30 00
Fax + 46 8 30 77 57
Internet info@sis.se

SWITZERLAND/SUISSE (SNV)

Swiss Association for Standardization
Mühlebachstrasse 54
CH-8008 ZURICH

Director: Dr. Hans C. Zürrer

Tel. + 41 1 254 54 54
Fax + 41 1 254 54 74
Telegram normbureau
Interet post@snv.snv.inet.ch
X.400 s=post; o=snv; p=snv; a=400net; c=ch

THAILAND/THAÏLANDE (TISI)

Thai Industrial Standards Institute
Ministry of Industry
Rama VI Street
BANGKOK 10400

Thaïlande

Secretary-General: Ms. Kanya Sinsakul

Tel. + 66 2 245 78 02
Fax + 66 2 247 87 41
Telex 8 43 75 minidus th (attention tisi)
Telegram thastan
Internet thaistan@tisi.go.th

TUNISIA/TUNISIE (INNORPI)

Institut national de la normalisation et de
la propriété industrielle
B.P. 23
1012 TUNIS-BELVÉDÈRE

Tunisie

Directeur général: M. Mohamed Chaouch

Tel. + 216 1 78 59 22
Fax + 216 1 78 15 63

TURKEY/TURQUIE (TSE)

Türk Standardlari Enstitüsü
Necatibey Cad. 112
Bakanliklar
06100 ANKARA

Turquie

President: Mr. Mehmet Yilmaz Ariyörük

Tel. + 90 312 417 83 30
Fax + 90 312 425 43 99
Telex 4 20 47 tse-tr
Telegram standard
Internet didb@tse.org.tr

UNITED KINGDOM/ROYAUME-UNI (BSI)

British Standards Institution
389 Chiswick High Road
GB-LONDON W4 4AL

Director: Mr. Peter Bonner

Tel. + 44 181 996 90 00
Fax + 44 181 996 74 00
Internet info@bsi.org.uk
X.400 c=gb; a=gold 400; p=bsi; o=bsi; s=surname;
g=first name

URUGUAY (UNIT)

Instituto Uruguayo de Normas Técnicas
San José 1031 P.7
Galeria Elysée
MONTEVIDEO

Uruguay

Director: Mr. P. Benia

Tel. + 598 2 91 20 48
Fax + 598 2 92 16 81
Telex 2 31 68 ancap uy
Internet unit@adinet.com.uy

USA (ANSI)

American National Standards Institute
11 West 42nd Street
13th floor
NEW YORK, N.Y. 10036

USA

President: Mr. Sergio Mazza

Tel. + 1 212 642 49 00
Fax + 1 212 398 00 23
Internet info@ansi.org

VENEZUELA (COVENIN)

Comisión Venezolana de Normas Industriales
Avda. Andrés Bello-Edf. Torre Fondo Común
Piso 12
CARACAS 1050

Venezuela

Executive Secretary: Mr. Tito G. Zambrano

Tel. + 58 2 575 22 98
Fax + 58 2 574 13 12
Telex 2 42 35 minfo vc
Telegram covenindus
Internet covenin@dino.conicit.ve

ZIMBABWE (SAZ)

Standards Association of Zimbabwe
P.O. Box 2259
HARARE

Zimbabwe

Director General: Dr. E.H. Williams

Tel. + 263 4 88 20 17
Fax + 263 4 88 20 20
Telegram saca

ESTONIA/ESTONIE (EVS)

National Standards Board of Estonia
Aru 10
EE-0003 TALLINN

Director General: Mr. Arno Univer

Tel. + 372 2 49 35 72
Fax + 372 654 13 30
Internet info@evs.ee

HONG KONG, CHINA

Industry Department
36/F., Immigration Tower
7 Gloucester Road
Wan Chai
HONG KONG

Hong Kong, China

Assistant Director: Mr. Brian Tyler

Tel. + 852 28 29 48 20
Fax + 852 28 24 13 02
Telex 5 01 51 indhk hx

JORDAN/JORDANIE (JISM)

Jordanian Institution for Standards
and Metrology
P.O. Box 941287
AMMAN 11194

Jordanie

General Director: Mr. Hassan Saudi

Tel. + 962 6 68 01 39
Fax + 962 6 68 10 99

KUWAIT/KOWEÏT

Public Authority for Industry
Standards and Metrology Affairs
P.O. Box 4690 Safat
13047 KUWAIT

Koweït

General Director Assistant: Mr. Yousef Al-Bahar

Tel. + 965 326 04 66
Fax + 965 245 11 41

MALTA/MALTE (MSA)

Malta Standardisation Authority
c/o Department of Industry
Kukkanja Street
ST. VENERA CMR 02

Malte

Secretary: Vacant

Tel. + 356 44 62 50
Fax + 356 44 62 57

PERU/PÉROU (INDECOPI)

Instituto Nacional de Defensa de la Competencia y de la Protección de la Propiedad Intelectual
Calle La Prosa 138
San Borja
LIMA 41

PÉROU

Gerente General: Mr. Fernando Zavala L.

Tel. + 51 1 224 78 00
Fax + 51 1 224 03 48
Internet postmast@indecopi.gob.pe

**UNITED ARAB EMIRATES/
ÉMIRATS ARABES UNIS (SSUAE)**

Directorate of Standardization and Metrology
Ministry of Finance and Industry
El Falah Street
P.O. Box 433
ABU DHABI

Émirats arabes unis

Director General: Mr. Obeid Ibrahim Darwish

Tel. + 971 2 72 60 00
Fax + 971 2 77 97 71
Telex 2 29 37 fedfin em

Appendix E:

Acronyms and Their Meanings

ACRONYM	MEANING
AIAG	Automotive Industry Action Group
ASQ	American Society for Quality (formerly American Society for Quality Control)
ASN	Advance Shipping Notification
ASTM	American Society for Testing and Materials
DVP&R	Design Verification Plan and Report (Chrysler, Ford)
ES	Engineering Specification (Ford)
ESD	Electro-Static Discharge
HVAC	Heating, Ventilation, and Air Conditioning
IASG	International Automotive Sector Group
ISO	International Organization for Standardization
KCC	Key Control Characteristic (General Motors)
KPC	Key Product Characteristic (General Motors)
NACE	Nomenclature générale des Activitiés économiques dans les Communautés Européennes
OEM	Original Equipment Manufacturer (e.g. Chrysler, Ford, General Motors).
QOS	Quality Operating System (Ford)
SC	Significant Characteristic (Chrysler, Ford)
SIC	Standard Industrial Classification
SPC	Statistical Process Control

Appendix F:

Change Summary

QS-9000 3rd Edition, 3rd Printing

Section II

GM Shipping/Parts Label Standard (GM 1724) - AIAG reference corrected, B3 to B10.

Chrysler pentagon deleted. Chrysler no longer uses the pentagon.

Other minor printing corrections were made.

Appendix C

Other minor printing corrections were made.

Contact Information

Ford contact information updated.

General Motors contact information updated.

QS-9000 3rd Edition, 2nd Printing

Introduction

Implementation, phone numbers for TE and R&M updated.
Quality System Documentation Progression, revised.

Section I

4.6.2.1 Note revised, added, "or" between ISO 9001 9002.

Section II

Chrysler Bibliography-contact numbers updated.
Chrysler Bibliography-Manual Type and Name, revised. (See below)
Diamonds/Key Quality Characteristics corrected to PS7300/Key Quality Characteristics.
General Motors-Boise Cascade Office Products, area code updated.

Contact Information

Chrysler contact information updated.

QS-9000 3rd Edition, Initial Printing

For this Third Edition of **QS-9000**, the following general changes have been made:

1. All Notes have been indented and new Notes have been added for guidance.
2. All Paragraphs have been numbered.
3. Section II has been incorporated into 4.2, and Section III renumbered to Section II.
4. Many **IASG Sanctioned QS-9000 Interpretations** dealing with content have been added to the text,

either as requirements or Notes. **IASG Sanctioned QS-9000 Interpretations** dealing with process have been placed in Appendix I.

5. Comparisons with the German VDA6.1, French EAQF94, and Italian AVSQ94 have been completed and additions made to **QS-9000** to increase compatibility with these documents.
6. The Glossary has been expanded.

Introduction

Approach revised.
Applicability, revised.
Implementation, revised.
Quality System Documentation Progression, revised.
Quality System Requirements Categories, added.

Section I

4.1.2.1	Responsibility and Authority, revised.
4.1.2.5	Information to Management, added.
4.1.4	Business Plan, revised.
4.1.5	Analysis and Use of Company Level Data, revised.
4.1.6.1	Certification Body/Registrar Notification, added.
4.2.3	Quality Planning, revised.
4.2.3.1	Advanced Product Quality Planning, revised.
4.2.3.2	Special Characteristics, revised.
4.2.3.4	Product Safety, added.
4.2.3.6	Mistake Proofing, added.
4.2.3.7	The Control Plan, revised.
4.2.4	Product Approval Process, revised.
4.2.5	Continuous Improvement, revised.
4.2.6	Tooling Management, revised.
4.3.2	Review, revised.
4.4.1.1	Use of Design Data, added.
4.4.5	Design Output, revised.
4.4.7	Design Verification, revised.
4.4.8.1	Design Validation - Supplemental, added.
4.4.9.2	Design Change Impact, added.
4.4.10	Customer Prototype Support, added.
4.4.11	Confidentiality, added.
4.5.1	General, revised.
4.5.2	Document and Data Approval and Issue, revised.
4.5.2.1	Engineering Specifications, revised.
4.6.1.2	Government, Safety and Environmental Regulations, revised.
4.6.2.1	Subcontractor Development, revised.
4.6.2.2	Scheduling Subcontractors, revised.
4.6.3	Purchasing Data, revised.
4.7.1	Customer Owned Tooling, revised.
4.8	Product Identification and Traceability, revised.

4.9.b.1	Cleanliness of Premises, added.
4.9.b.2	Contingency Plans, added.
4.9.g.1	Preventive Maintenance, revised.
4.9.1	Process Monitoring and Operator Instructions, revised.
4.9.2	Maintaining Process Control, revised.
4.9.3	Modified Process Control Requirements, revised.
4.9.4	Verification of Job Setups, revised.
4.9.5	Process Changes, revised.
4.9.6	Appearance Items, revised.
4.10.1	General, revised.
4.10.2.4	Incoming Product Quality, revised.
4.10.4.2	Final Product Audit, added.
4.10.6	Supplier Laboratory Requirements, added.
4.10.7	Accredited Laboratories, revised.
4.11.2.b.1	Calibration Services, added.
4.11.3	Inspection, Measuring, and Test Equipment Records, revised.
4.11.4	Measurement System Analysis, revised.
4.12	Inspection and Test Status, revised.
4.13.1.2	Visual Identification, added.
4.13.3	Control of Reworked Product, revised.
4.13.4	Engineering Approved Product Authorization, revised.
4.14.1.2	Mistake Proofing, added.
4.14.2.2	Corrective Action Impact, added.
4.15.3.1	Inventory, revised.
4.15.4.1	Customer Packaging Standards, revised.
4.15.6.1	Supplier Delivery Performance Monitoring, revised.
4.15.6.3	Electronic Communication, added.
4.16.1	Record Retention, revised.
4.17	Internal Quality Audits, revised.
4.17.1	Internal Audit Schedules, added.
4.18.1	Training Effectiveness, revised.
4.20.3	Selection of Statistical Tools, revised.

Section II

Each customer has made revisions to their pages.

Appendices

Appendices A, B, C, D, E, F, G, and H have been revised.
Appendices I and J are added.

Glossary

Many previous definitions in the Glossary have been revised and numerous definitions have been added.

Appendix G:

QS-9000 Accreditation Body Implementation Requirements

Below are requirements with regard to **QS-9000** implementation including: criteria for certification body/ registrar qualification, certification body/registrar auditor qualifications, certificates, and upgrading of certification body/registrar accreditation to include **QS-9000**. These requirements will apply to all Chrysler, Ford and General Motors-recognized accreditation bodies and the certification bodies/registrars qualified by those accreditation bodies to conduct **QS-9000** registrations.

A. QUALIFIED CERTIFICATION BODIES/REGISTRARS shall:

1) Provide accreditation bodies with **written agreement** to conduct **QS-9000** registrations in compliance with the **QS-9000** Appendix B "Code of Practice".

2) Provide accreditation bodies, prior to beginning **QS-9000** registrations, **relevant documentation** showing that the certification body/registrar process complies with: a) the **QS-9000** Appendix B "Code of Practice", and b) the certification body/registrar requirements in this appendix.

3) **Maintain a listing** of their **QS-9000** qualified auditors.

4) Management assigned responsibility for ISO Guide 62:1996 (E), clause 2.1.2.j, shall include personnel that have **automotive industry experience** as well as expertise in the appropriate SIC/NACE codes for their scope.

5) Have **at least one** member of those responsible for their certification function successfully complete (pass the exam) the sector-specific training referred to in A.12 below. This member shall have **veto power** with regard to **QS-9000** registration decisions.

6) Utilize an audit team which has at least one member with **relevant experience** in the automotive industry.

7) Not use the **QS-9000** notation on **certificates** until after the accreditation body has **witnessed and approved** a certification body/registrar's **QS-9000** audit. Certification body/registrar clients for **QS-9000** are obligated to allow accreditation body representatives on-site to accompany the certification body/registrar auditors on witness audits. Approval or closure of corrective actions by the accreditation body should occur during the witness audit, if verification of effectiveness is possible at that time.

8) Be permitted, after the witness audit has been completed satisfactorily, to **update the ISO 9000 certificates to QS-9000 certificates** of previously-assessed companies who were found to be in compliance to **QS-9000**. The certification body/registrar is limited to three of these instances and

subject to B.1). Where the certification body/registrar does not satisfactorily complete the witness audit, the certification body/registrar shall be responsible for remedies for any previously-assessed companies appropriate to the severity of the problems discovered, and as agreed upon by the accreditation body. No additional **QS-9000** audits are permitted until the certification body/registrar corrective actions are accepted by the accreditation body.

9) Provide **at least 8 weeks advanced written notification** to the accreditation body of each **QS-9000** assessment scheduled, until their **QS-9000** audit is satisfactorily witnessed.

10) **Plan their initial four QS-9000 assessments** so that no more than three occur during any consecutive four week period.

11) Be permitted to use **a full QS-9000 or an ISO 9000 upgrade** to **QS-9000** as a witness assessment.

12) Utilize **auditors** that a) are recognized and qualified as ISO 9000 auditors, which does not include "Provisional" auditors, per the accreditation body's criteria, and b) are sector-specific qualified by Chrysler, Ford and General Motors as evidenced by a certificate sent to the certification body/registrar [completion of the required training offered through the Automotive Industry Action Group (AIAG) in the USA at 01-248-358-3003, followed by an exam. Enrollment in these classes is accomplished through a specified certification body/registrar-designate on behalf of auditors which the certification body/registrar sponsors, and is not open to consultants, or individuals]; and c) have relevant industry experience as determined by the accreditation body's current SIC/NACE qualification process. See Appendix I, Auditor Qualifications-European Scheme.

13) Provide **certificates of registration** to **QS-9000** compliant organizations citing conformance to **QS-9000**, and that cite the relevant ISO 9000 standard, without reference to the **QS-9000** sections, having been audited in accordance with the requirements of the **QS-9000**, Appendix B "Code of Practice".

14) **Define** delisting **criteria**, and steps for delisting **QS-9000** registrants.

15) Be responsible for **remedies** for any **QS-9000** registrants affected by the delisting of the certification body/registrar by the accreditation body, appropriate to the severity of the problems discovered. These remedies shall be agreed upon by the accreditation body.

16) Notify ASQ, the provider of the sanctioned **QS-9000** Registered Company Database within ten (10) working days, of all sites registered to **QS-9000** and of changes in registration status of current registered sites. All information shall be communicated in the ASQ-specified format. All information requested shall be provided.

B. RECOGNIZED ACCREDITATION BODIES shall (except as noted below):

1) Agree to abide by the requirements defined in **QS-9000** Third Edition, Appendices G, I and the **IASG Sanctioned QS-9000 Interpretations**.

2) Have a process implemented which ensures their compliance with QS-9000 requirements (Appendices G, I, and the **IASG Sanctioned QS-9000 Interpretations**).

3) Should be the official designate of their national government for accreditation of certification bodies/ registrars for quality system certification/registration.

4) Not operate as both an accreditation body and a quality systems certification body/registrar.

5) Have experience in accrediting certification bodies to ISO 9001, covering both initial and surveillance visits.

6) Qualify certification bodies/registrars by a recognized commodity code scheme, e.g. SIC, NACE.

7) Should participate in an on-going peer review process with other internationally recognized accreditation bodies.

8) Should not limit opportunity for interested and ISO 9000 accredited certification bodies/registrars to become **QS-9000**-qualified by their organization.

9) Have a process implemented which ensures their accredited certification bodies'/registrars' compliance with **QS-9000** Third Edition, Appendices B, G, H, I and the **IASG Sanctioned QS-9000 Interpretations**.

10) Be responsible for providing an **auditor (audit team)** to witness one of the **first four** certification body/registrar **QS-9000** audits of any accredited certification body/registrar completing items A.1) and A.2) above (see A.8). The accreditation body will notify Chrysler, Ford, and General Motors of the date when each certification body/registrar has successfully completed the witnessing above.

11) Be responsible in the **conduct of witnessing** for utilizing any outside experts or observers needed. This responsibility shall include avoidance of conflict of interest, availability, and timeliness.

12) **Define:** a) delisting **criteria**, and steps for delisting **QS-9000** qualified certification bodies/registrars, and b) an appropriate process for **appeal** of a witnessing decision, or any other step in the **QS-9000** process.

13) Provide a **certificate**, or similar formal notification, one which can be used to document the certification body/registrar's qualification, to each qualified **QS-9000** certification body/registrar who has met all requirements of **QS-9000** Appendix B "Code of Practice", and this document.

14) Notify ASQ, the provider of the sanctioned **QS-9000** database within ten (10) working days, of all certification bodies/registrars qualified to issue certificates citing compliance with **QS-9000**. Changes in the qualified status of current certification body/registrars shall also be promptly communicated to ASQ. All information shall be communicated in the ASQ-specified format. All information requested shall be provided in the submission.

15) Provide support for the administration of local **QS-9000** certification body/registrar auditor training when requested (see **QS-9000** Certification Body/Registrar Training Responsibility Matrix below).

QS-9000 CERTIFICATION BODY/REGISTRAR TRAINING RESPONSIBILITY MATRIX

LEGEND R = Responsible C = Consulted I = Informed S = Support		TASK FORCE	ACCRED. BODY	C.B. / REGISTRARS	AIAG	TRAINER
1.	Issue official recognition letter to accreditation body	R	I		S	
2.	Provide list of accredited **QS-9000** C.B./Registrars & applicants		R		I	
3.	Assess training needs (How many training sessions?)	I	R	C	I	
4.	Provide registration requirements and procedures to accreditation body	C	I		R	
5.	Request training & recommend possible training dates		R	C	I	I
6.	Confirm availability of instructor	S	I	I	R	C
7.	Select and secure training facility		R	C	I	
8.	Identify local costs (hotel, meals, beverage service, AV equipment, etc.)		R		I	
9.	Secure Interpreters and obtain Interpreter quote (if needed)		R		I	I
10.	Compile all cost information and finalize course price	I	C	I	R	
11.	Finalize training dates	I	C	C	R	C
12.	Develop course flyer/brochure/registration form	C	I	I	R	S
13.	Distribute course flyer/brochure/registration form to C.B./Registrars and applicants		R	I	I	
14.	Audit course registrations to verify auditors are properly sponsored		R	S	I	
15.	Process course registrations		S		R	
16.	Issue confirmation letters to attendees			I	R	
17.	Ship course materials		S		R	
18.	Receive course materials & return shipment content checklist to AIAG		R		I	
19.	On-site registration support (check-in, material distribution, etc.)		R		S	S
20.	Fax out exam pass/fail information	I	I	I	R	S
21.	Mail out certificates to **QS-9000** accredited C.B./Registrars (if appropriate)	I		I	R	
22.	Process certificate revisions		S	S	R	

C. CHRYSLER/FORD/GENERAL MOTORS

1) While continuing to enhance the **QS-9000** third party process and requirements, will continue to support and respect the independence of the third party system.

2) Will maintain an established, authorized **QS-9000** team with whom the accreditation bodies and certification bodies/registrars can communicate.

3) Will share appropriate **QS-9000** supplier communications with their recognized accreditation bodies.

4) Will recognize any witness audit of a certification body/registrar (accredited by a customer-recognized national accreditation body). These accreditation bodies are encouraged to implement a mutual recognition of each other's witness audits, described herein above.

5) May elect to rescind recognition of accreditation bodies to qualify certification bodies/registrars, or certification bodies, to conduct **QS-9000** registration when any of the following situations occur:

a. failure to control an accredited certification body/registrar's (herein same as "certification bodies") compliance with **QS-9000**: Third Edition Appendices B, G, H, I, or the latest published **IASG Sanctioned QS-9000 Interpretations**. This includes adherence to the IAF Guidance on the Application of ISO/IEC Guide 62:1996, Issue 1, 2 June, 1997**,** except where Appendices B, G, H or I deviate from the said IAF Guidance.

b. failure to control an accredited certification body/registrar's compliance with ISO/IEC Guide 62 and the IAF Guidance on the Application of ISO/IEC Guide 62.

c. the accreditation body permits upgrading of certificates from ISO 9000 to **QS-9000** based upon alternate routes to ISO 9000 registration (see Appendix B.13).

d. failure to initiate delisting process for certification bodies/registrars whose audit reports, based upon Chrysler, Ford and General Motors consensus, demonstrate unacceptable deficiencies in auditing, assessing, and/or status of a client's compliance to either ISO 9000 or **QS-9000**.

e. allowing certification bodies/registrars to conduct **QS-9000** audits with auditors that have not been sector qualified per Appendix G, Accreditation Body Implementation Requirements.

f. resources allocated to the accreditation body's **QS-9000** responsibilities are not sufficient, based upon Chrysler, Ford and General Motors consensus, to maintain the integrity or consistency of the **QS-9000** registration process. This includes, but is not limited to, support of the **QS-9000** certification body/registrar training courses and subsequent exam, surveillances or witness audits of their **QS-9000**-qualified certification bodies/registrars. Responsibilities for the training support are defined in the Chrysler, Ford and General Motors **QS-9000** Certification Body/Registrar Training Responsibility Matrix (see B.15 above).

g. Steps to be followed are:
   - Chrysler, Ford or General Motors shall promptly notify the accreditation body when any of the above occurs. The accreditation body shall be given opportunity to resolve the issues involved in a timely manner.
   - If the accreditation body response is inadequate, or delayed beyond a reasonable amount of time, based upon Chrysler, Ford or General Motors consensus, then the accreditation body will be put on alert that Chrysler, Ford and General Motors recognition will be withdrawn within 30 days if issues remain unresolved. The accreditation body shall promptly notify their accredited **QS-9000**-qualified certification bodies/registrars of this action at this step.
   - After 30 days, the Chrysler, Ford and General Motors recognition of that accreditation body to qualify certification bodies/registrars to **QS-9000** shall be withdrawn. Certifications bearing only the mark of a de-recognized accreditation body (and no mark from any other recognized accreditation body) may not be recognized by Chrysler, Ford or General Motors.

Appendix H:

QS-9000 Registration Audit Day Requirements

Table A below shows the MINIMUM number of on-site auditor days which should be spent by the certification body/registrar on initial **QS-9000**/ISO 9001 quality system audits (see Glossary) and ongoing surveillance audits (see Appendix B, Number 7). Surveillance audits should typically be scheduled every six months, but each site shall be surveillance audited at least once every 12 months. Table A now indicates the minimum number of "on-site auditor days within each 12-month period." The MINIMUM number of auditor days for **QS-9000**/ISO 9002 audits may be reduced by 20%. Certification bodies/registrars will document actual on-site auditor days, including any deviation below the MINIMUM. Accreditation bodies will review such documentation for appropriateness. Table A was developed to primarily apply to one site/one certificate situations.

Certificated Entity: Number of Employees	**Initial Audit (On-site Auditor Days)**	**Surveillance On-Site Audits if Conducted at 6-Month Intervals (Minimum Number of Auditor Days)**	**Ongoing Surveillance Audits: (On-site Auditor Days within each 12 Month Period)**
1-15	**2**	**1.0**	**2**
16-30	**4**	**1.0**	**2**
31-60	**5**	**1.5**	**3**
61-100	**6**	**1.5**	**3**
101-250	**8**	**2.0**	**4**
251-500	**10**	**2.5**	**5**
501-1000	**12**	**3.0**	**6**
1001-2000	**15**	**3.5**	**7**
2001-4000	**18**	**4.5**	**9**
4001-8000	**21**	**5.5**	**11**

Table A: Survey Audit Days

The number of hours per day required for an "auditor day" shall be defined as not less than eight hours of a 24-hour day per auditor on-site performing the audit.

Notes on Table A:

1. Initial Audit (On-site Auditor Days) cannot include "pre-audit document review" (whereas the IAF Guidance on the Application of ISO/IEC Guide 62 does).

2. Initial Audit (On-site Auditor Days) cannot include "pre-assessments" which are provided for supplier feedback only, with non-binding review, and corrective actions that are not part of the registration audit (don't appear in the final report).

3. Initial Audit (On-site Auditor Days) a) can include single or multiple registration audit visits which occur less than three months after document review and the audit matrix are completed; b) do include binding nonconformances leading to; c) approved corrective actions which are included in the final registration audit report; and d) the audit team conducting subsequent visits or steps during the three-month process must be comprised of at least one **QS-9000** qualified member from the previous on-site audit team.

4. Auditor days for registration upgrades from ISO 9001 or ISO 9002 to **QS-9000** are not addressed in this table.

5. Each audit shall include auditing on all shifts. If weekend crews are dedicated and non-rotating, then auditing of the weekend shifts is required.

In summary, only those auditor days subsequent to completion of the document review, and development of the audit matrix, and that occur within a consecutive three month period may be counted as auditor days in accordance with Table A. Also, see Table B below.

The certification body/registrar should treat these auditor days as true minimums. If the days quoted are below the minimums stated, the accreditation body shall assess the validity of such justification. (Refer to **Accreditation Body Notification** which follows). The actual on-site "initial audit" auditor days must be reported in the **QS-9000**/ISO 9001 or the **QS-9000**/ISO 9002 registration report.

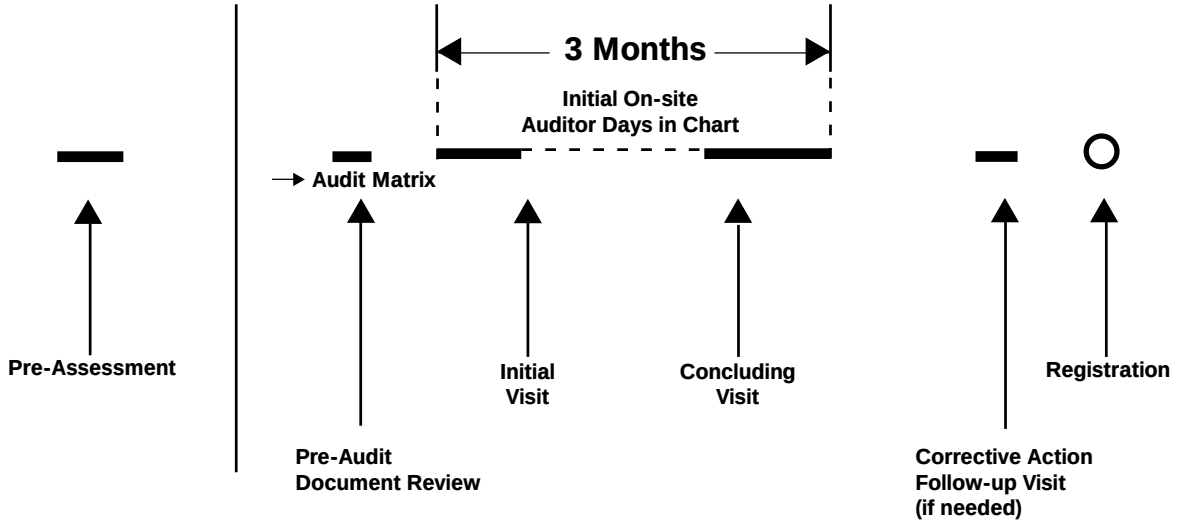


Table B

Chart Definitions

Column #1 of Table A, entitled Certificated Entity: Number of Employees, represents the total number of employees per site including all shifts, and all administrative, professional, etc. staff.

Column #2 of Table A, entitled Initial Audit (On-site Auditor Days), represents the minimum number of auditor days for a site undergoing a single certificate site audit. Time required for documentation review is in addition to these days.

"Sites" are defined as locations at which production processes occur; "corporate" schemes apply only to multiple site registrations. Remote locations, e.g. Engineering, Purchasing, must be audited as they support a "site(s)," but auditor days to conduct these audits are included in a "site" audit as defined in the Table A.

Corporate/Multi-site Considerations

In multi-site situations, hereafter called a "Corporate" Audit Scheme, wherein multiple sites are assessed to be provided a single certificate, the following additional guidelines apply before a certification body/registrar can apply a "Corporate" certificate for **QS-9000**.

In order to adequately assess the quality system, it is necessary to visit every site but it is recognized that the number of auditor days required to effectively assess each site may be less per site than the number given in the Table A.

The conditions required of the company for a "Corporate" certificate include:

a) The quality system must be centrally structured and managed, and subjected to regular **QS-9000** compliant internal audits at all sites.
b) The quality system must comply with **QS-9000**. If the system includes ISO 9001, all design activities must be evaluated.
c) The balance of activities which could be centrally managed include:
   1) contract review, where local acceptance of orders is permitted;
   2) approval of suppliers;
   3) evaluation of training needs (activity may have local aspects);
   4) quality manual (Level 1 and Level 2) documentation and changes in same;
   5) management review;
   6) evaluation of corrective actions;
   7) internal audit planning and evaluation of the result;
   8) quality planning and continuous improvement activities (activity may have local aspects); and
   9) design activities.

Note: Variations are acknowledged due to size and/or organizational structure.

The certification body/registrar must establish, during the quotation process, how the multi-site company falling under the "Corporate" scenario meets these requirements.

Auditor Day Adjustment for "Corporate" Audit Scheme

As a minimum, for a "corporate" certificate, the on-site auditor days per site, are not expected to be less than the percentage in Table C below of the auditor day values per site shown in Table A. The same logic applies to the surveillance auditor days in the Table A. "Sites" are defined as locations at which production processes occur; "corporate" schemes apply only to multiple site registrations. Remote locations, e.g. Engineering, Purchasing, must be audited as they support a "site(s)," but auditor days to conduct these audits are included in a site audit as defined in the Table A.

TABLE C - Auditor Day Adjustment for "Corporate" Audit Scheme

Number of Sites	Percent Reduction To
2 - 9	70
10 to 19	60
20 and above	50

Accreditation Body Notification

It is recognized that in "Corporate" multi-site audit approaches, the on-site auditor days per site may, with appropriate justification, be reduced to the percentages shown in Table C of the levels shown in Table A for On-site audit days and/or surveillances.

For any "site" approach used by a **QS-9000** qualified certification body/registrar, if the certification body/registrar quotes auditor days per site below the minimum levels shown in Table A, the certification body/registrar must notify its **QS-9000** accreditation bodies of the quoted auditor days via the "**QS-9000** Reporting Table." Also, he must provide the relevant supplier information, i.e. employees, number of sites, and product scope, in order to justify the quote.

For any "corporate" approach used by a **QS-9000** qualified certification body/registrar, if the certification body/registrar quotes auditor days per site below the percentages of the minimum levels per site shown in Table C, the certification body/registrar must submit/notify its **QS-9000** accreditation bodies of the quoted auditor days via the "**QS-9000** Reporting Table." Also he must provide the relevant supplier information, i.e. employees, number of sites, and product scope, in order to justify the quoting of fewer auditor days than permitted.

These notifications must occur within five days of the quotation date to the client. The accreditation body is expected to review each of these inputs and take corrective and preventive action where appropriate.

Noncompliance places at risk the certification body/registrar, accreditation body and the resulting supplier **QS-9000** certification.

Appendix I:

Additional QS-9000 Registration Requirements

1. **General**
   These requirements are in addition to Appendices B, G, and H. They were developed from the latest issue of the **IASG Sanctioned QS-9000 Interpretations** at time of printing. Should additional sanctioned interpretations be published, they will be binding for registration.

2. **Misrepresentation of Information**
   Misrepresentation of customer complaint information (for customers subscribing to **QS-9000**) by a supplier to a certification body/registrar shall result in the certification body/registrar immediately invoking their delisting process for that supplier and immediately notifying the customer(s) involved.

3. **Customer Waivers**
   Where **QS-9000** permits waivers from the customer [e.g. CAD (4.4.4) and ASN (4.15.6.4)], objective evidence of such waivers shall be obtained and shall be available to show auditors.

4. **Subcontractor Development**
   When a subcontractor is so small as to not have adequate resources to develop a system according to **QS-9000**, Section I, certain specified **QS-9000** sub-elements may be waived by the supplier of their subcontractor. The majority of **QS-9000** contains fundamental quality system requirements which would be of value to any size of provider of production/ service parts/ materials. Note that there are many ways to implement a compliant system, so a simpler approach could be used for the smaller subcontractors.

5. **Section II Compliance**
   A supplier can only be held accountable to the Section II requirements of its current customers. However, the supplier would be expected to have a documented policy and procedures stating that future order acceptance from additional OEMs would include their meeting of the additional Section II requirements, as appropriate. This must be monitored by the certification body/registrar in surveillances to determine if compliance with other customer requirements is appropriate, e.g. Element 4.3.

6. **Confidentiality of Third-Party Certification Body/Registrar Reports**
   Any customer requiring **QS-9000** compliance can request and receive, a copy of the **QS-9000**/ISO 9001 or **QS-9000**/ISO 9002 certification report from their supplier, or the supplier may authorize the certification body/registrar to provide the report. It should not contain any proprietary information outside of the results of the **QS-9000** system's audit. You can request that any (truly) proprietary information be removed.

7. **Providers of Chrysler/Ford/General Motors Sanctioned QS-9000 Auditing Training**
Automotive Industry Action Group (AIAG) is the sole contact for **QS-9000 registrar auditor** training. There are no certification bodies/registrars qualified to deliver registrar auditor training. Providers of sanctioned supplier training are subject to the restrictions of Appendix B and **QS-9000** definition for consulting.

Sanctioned **QS-9000** Internal Auditing training is available worldwide from AIAG and Bureau Veritas (see Foreword for contact phone numbers). The purpose of the internal auditing training is to provide OEM and supplier auditors with an appropriate understanding of **QS-9000** and audit process requirements (e.g. ISO 10011). This class is not required.

8. **Copyright Permission for Training Materials**
Training organizations cannot reproduce copyrighted material (e.g. **QS-9000**, **QSA**, **PPAP**) without permission of the content owners (which has not been given to any non-sanctioned trainers). **QS-9000** manuals could be purchased and utilized in the classes. Costs of the manuals can be recovered in tuition charges paid by the class participants.

9. **Sanctioned Translations of QS-9000 and Other Manuals**
Sanctioned **QS-9000** translations in the following languages are available at this time: French, German, Castilian Spanish, Latin American Spanish and Portuguese. For further information, contact AIAG or Carwin Continuous.

English is the official language for **QS-9000** worldwide and shall be used for **QS-9000** registration/ compliance. Sanctioned translations are for reference only and must reference English as the official language, must not contain the ISO 9001 text verbatim, and are copyrighted by Chrysler, Ford and General Motors.

10. **Obsolete Specifications**
Whatever specifications are being used by the customer should be used and retained by a supplier; i.e., keep all old specs in an active (see Glossary - Active Part) mode until they are no longer in use by the customer. Contract review by a certification body/registrar should take this into account if the supplier can show an active PO or requirement to use the outdated specification.

11. **PPAP Requests**
If there have been no changes in "part number, engineering change level, manufacturing location, material subcontractors or production process environment" since 1987, then no PPAP's would be expected unless specifically requested/notified by the OEM customer for that product. PPAP procedures must be in place and effective as appropriate for **QS-9000** registration.

12. **PPAP Retroactivity**
When suppliers have active part numbers which do not have the required PPAP documentation, the supplier shall initiate corrective action to ensure that they are in compliance with PPAP going forward. The supplier should contact their customer part approval activity for further direction on how to disposition the existing PPAP files.

13. **PPAP for Suppliers of Catalog Items**
Suppliers of catalog items shall comply with **PPAP** unless specifically waived by the customer. Tooling must be maintained for catalog items as long as the items are offered or stated as being available.

14. **Retroactivity of 4.6.1.1 (Approved Materials) to Existing Subcontractors**
Where suppliers have product in production which contain material purchased from subcontractors not on the customer approved subcontractor lists, such materials are nonconforming. The supplier should take appropriate actions to correct the noncompliance in order to proceed, e.g. use an approved subcontractor, get the unapproved subcontractor added or get a customer waiver. The supplier would also have to notify the customer that the product is "suspect" material per Element 4.13.1 until it can be dispositioned.

15. **Customer Performance Requirements**
Effectiveness of a company's system must be measured by indicators which directly correlate and meet customer performance requirements, such as customer satisfaction (4.1.6), on-time delivery (4.15.6) or continuous improvement (4.2.5), and tracked by the use of these indicators. The presence of continued poor trends in these indicators, audit to audit, will jeopardize continued **QS-9000** registration.

16. **Customer Satisfaction**
To satisfy the **QS-9000** requirement for determining customer satisfaction (4.1.6), customers such as Chrysler, Ford, GM provide suppliers with performance reports either on-line, e.g. Chrysler's "PASS" report and GM's PRR system, or monthly, e.g. GM's "quad" report for North American suppliers listing the relevant performance data. Certification bodies/registrars should ask suppliers for copies of such reports to determine customer satisfaction during the registration audit and during surveillance.

17. **ISO 9000 Upgrade to QS-9000 Process**
In general, assure that the certification body/registrar is **QS-9000** qualified, approved for the applicable business sector (SIC, NACE) and that all **QS-9000** guidelines and rules are followed for both/all steps, i.e., use of only **QS-9000** qualified auditors for all steps, etc.

Registration to **QS-9000** could be achieved in a variety of ways:
a) a two-step process for one site, within the three-month window,
b) a two-step (or more) process involving a multi-site/corporate certificate, involving many months from auditing of the initial site to completion of the final site or design location,
c) a two-step process wherein ISO 9001 or ISO 9002 certification was obtained first, followed by **QS-9000** upgrade later.

Where **QS-9000** is an established customer requirement, all steps must meet **QS-9000** Appendices B, G, H and I requirements and any further requirements published in the **IASG Sanctioned QS-9000 Interpretations**. The audit team for all steps must be "**QS-9000** qualified," etc., and the individual on-site auditor days of auditing must meet the **QS-9000** requirements (see Appendix H).

If the first step involves ISO 9000 certification, it is expected to meet IAF Guidance on the application of ISO/IEC Guide 62 minimum auditor day requirements for ISO 9000. If the full team for the first, or any, step did not meet all **QS-9000** requirements, then the auditor day requirements for the **QS-9000** upgrade step(s) must meet the full Appendix H auditor day values.

If the ISO 9000 (first step) occurred before April 1, 1996 and the upgrade to **QS-9000** (second step) occurs after April 1, 1996, then the certification body and the accreditation body must agree on the appropriate on-site auditor days for the upgrade given that all **QS-9000**-specific requirements are covered, and **QS-9000** qualified auditors are utilized for the upgrade. For audits where both steps occur after April 1, 1996, the initial H-chart auditor day requirements apply to the combined audit days. If the upgrade coincides with a surveillance audit, then the surveillance day requirements are in addition to the Initial H-Chart auditor day requirements.

18. **QS-9000 Certificates**

The term **QS-9000** is a copyright protected property of Chrysler, Ford and General Motors. Only those third party certification bodies/registrars accredited for **QS-9000** by a Chrysler, Ford and General Motors recognized accreditation body are permitted to issue a registration certificate with the term **QS-9000**.

Registration to **QS-9000** includes registration to either ISO 9001 or ISO 9002. **QS-9000** registrations can only be attained once the firm has been audited and found to be in conformance with either ISO 9001 or ISO 9002 and **QS-9000**. Both references to conformance with ISO 9001 or ISO 9002 and **QS-9000** will appear on the registration certificate.

19. **Scope Clarification**

Where a supplier site (see Applicability and Glossary) operates in the same building as other sites, the site which wishes to be **QS-9000** registered may do so (separately from the other sites) if it addresses all elements of **QS-9000** (with requirements as noted in **QS-9000** Introduction: Applicability), has a unique supplier code issued by the customer, and all of the automotive products for customers subscribing to **QS-9000** at the site are included in the **QS-9000** registration.

20. **Multiple Certification Bodies/Registrars - Same Company**

For a supplier with several technical centers and numerous manufacturing sites across the world, it is possible that **QS-9000**-qualified certification bodies/registrars, using **QS-9000**-qualified auditors, could recognize each other's audits of companies. An agreement between certification bodies/registrars is usually obtained beforehand, whereby Certification Body/Registrar A could audit a manufacturing site to **QS-9000**, and Certification Body/Registrar B conduct an audit of a remote location, e.g. design center, if deemed necessary. Certification Body/Registrar B would submit its audit report to Certification Body/Registrar A who could then review the audit report, and when A is satisfied, issue a **QS-9000**/ IS0 9001 certificate covering both the manufacturing site and the design center.

21. **Witness Audit Must Be a Chrysler, Ford, or General Motors Supplier**
An acceptable witness audit for certification body/registrar qualification must include a supplier which meets all applicability requirements at the ISO 9001 level, and is a supplier of production or service parts to Chrysler, Ford, or GM.

Examples of suppliers which would not qualify for the witness audit are: Heat treaters, Platers, Painters, Strip or Slitting operations, Assembly-only operations. Those that qualify for witness audit are those that design and manufacture production parts (**QS-9000**/ISO 9001).

22. **ASQ Sanctioned Worldwide Registered Company Database Notification**
The **QS-9000** certificated supplier information shall now be provided to the ASQ, the sanctioned database provider, by each **QS-9000** qualified certification body/registrar. The record should include:

1) Certified Company Name
2) Certified Company Address (mailing)
3) Certified Company Site Address
4) Certified Company Telephone Number
5) Certified Company Facsimile Number
6) Certified Company ISO Contact
7) ISO 9000 Standard Registered to
8) **QS-9000** Edition Registered to
9) Issue Date of Initial **QS-9000** Certificate
10) Registrar for Initial **QS-9000** Certificate
11) Issue Date of Current **QS-9000** Certificate
12) Certificate Number of Current **QS-9000** Certificate
13) **QS-9000** Scope
14) Commodity Code (U.S. SIC or NACE)
15) Issuing Certification Body/Registrar Name
16) Issuing Certification Body/Registrar Office Address
17) Issuing Certification Body/Registrar Office Telephone
18) Accreditation Bodies Shown on Certificate
19) Supplier Code for each customer, e.g. Duns Number

This information shall be communicated in the ASQ-specified format. Each **QS-9000** qualified certification body/registrar must maintain and can make public their list of **QS-9000** registered companies.

23. **QS-9000 Certificate Requirements**
The certificate must meet all requirements of a typical ISO 9000 certificate and, in addition:

a) **QS-9000** scope statement(s) must include all products and services being supplied to one or more of the companies subscribing to this document;
b) cite a separate **QS-9000** scope (if applicable), **QS-9000** Edition registered to, e.g. **QS-9000**: 1995, date of registration, date of expiration (if applicable), the current issue of the relevant ISO 9000 Standard, e.g. ISO 9001:1994;

c) include the phrase somewhere on the first page: "having been audited in accordance with the requirements of **QS-9000** Appendix B, Code of Practice;"
d) list on the front page the company name, address, date of registration, date of expiration (if applicable), **QS-9000** scope: If any appendix/schedules are a part of the certificate, the certificate must note that more pages are included, e.g. Page 1 of 3;
e) include for multi-site certificates every registered site, its location, and scope;
f) include any remote locations, e.g. design centers, purchasing, contract review, etc., which are part of the quality system and have been audited, their locations and scopes. If a remote location supports more than one site, the remote location shall appear on each site certificate; and
g) include the name of the certification body/registrar, with its issuing office identified (city/state/country) and the mark of at least one **QS-9000** recognized accreditation body.

Certificates shall not reference other documents for which the certification body/registrar is not accredited or qualified, e.g. **Tooling and Equipment Supplement**, ISO/IEC Guide 25, etc.

24. **Auditor Qualifications: Laboratory Issues**

A **QS-9000** auditor must meet all **QS-9000** qualified auditor requirements. It is of benefit if the **QS-9000** auditor is also familiar with the contents of ISO/IEC Guide 25, and even better (but not required), if the auditor has some experience in auditing to Guide 25. Auditing the quality system compliance of labs and testing facilities is but a small part of **QS-9000**.

An auditor with only Guide 25 experience has only part of the experience and capability required to audit to **QS-9000**. Auditor teams for **QS-9000**-qualified certification bodies/registrars must be qualified to audit in-house lab facilities in order to audit compliance to **QS-9000**, including Clause 4.10 and 4.11. Auditor on-site verification must include:

- adequacy of the laboratory procedures;
- qualifications of the lab personnel conducting tests;
- conducting of the appropriate tests for the commodity(s); and
- performing these tests correctly, to the appropriate process standard, (e.g. ASTM).

Accreditation bodies must provide competent auditors for the certification body/registrar witness audits and verify that adequate time is devoted to the audit of the in-house laboratories by certification bodies/registrars.

25. **Auditor Qualifications-European Scheme**

Auditors qualified in other accepted automotive ISO 9000-based schemes (e.g. AVSQ, EAQF, VDA6) may, at their discretion, elect to take the **QS-9000** auditor exam (see Appendix G, A.12) without attending the **QS-9000** Registrar Auditor Training class. These auditors are subject to all other **QS-9000** auditor qualification requirements.

26. **Use of Foreign Auditors by Certification Bodies/Registrars**
    A certification body/registrar may perform an audit in a foreign country using one or more **QS-9000** qualified auditors provided by a non **QS-9000** qualified accredited certification body/registrar of that country provided that the **QS-9000** requirements for audit team continuity and make-up are being met by the **QS-9000** qualified certification body/registrar. Use of subcontracted auditors from another certification body/registrar often limits controls. Their use should represent a minority of team auditor days.

27. **Evaluating Effectiveness in 4.2.6.1 - Facilities, Equipment, and Process Planning and Effectiveness**
    The auditor shall look for documented evidence that the company has evaluated and/or developed methods for the measuring and monitoring of the effectiveness of existing operations.

28. **Auditing Section II**
    Each applicable item in Section II shall be audited during the initial audit and in the surveillance visits over the subsequent three-year period (See **QS-9000** Appendix B.7). Conformance to Section II requirements shall be evaluated under Element 4.3 (Contract Review). The certification body/registrar shall ascertain which of the Section II requirements are applicable based on your automotive customers; this should occur at the pre-audit visit, or before the registration audit. A supplier cannot receive a **QS-9000** registration with any open nonconformities in Section II.

29. **Reporting Opportunities for Improvement in the Audit Report**
    These opportunities shall be included in the report to the supplier (see **QS-9000** Appendix B.8). If none are found, a statement to that effect must be reported. Opportunities for improvement, by definition, are not nonconformities.

30. **Auditing Safety, Health and Environmental Compliance**
    The supplier shall have knowledge of those requirements that are applicable and that the supplier have evidence of compliance to applicable requirements, but the third party **QS-9000** auditor is not expected to conduct any type of compliance audit to these requirements.

31. **Pre-Assessment Audit**
    A pre-assessment audit is not considered consulting. See Item 2 under Notes in Appendix H for a summary definition of a pre-assessment. A pre-assessment by a certification body/registrar cannot include consulting. Note: Repeated pre-assessments by a certification body/registrar can be perceived as consulting.

32. **Multi-Site Registration Issues**
    For suppliers that are multi-site, each site (see Glossary) must be audited; individual certificates for each are permissible but not necessary. “Sampling” of sites, which can be used in ISO 9000 registrations, is not permitted for **QS-9000** registration.

For suppliers that are design responsible, with a design center that is a remote location (see Glossary), the design center must have been assessed and certified as being 4.4 compliant, prior to the issuance of any **QS-9000**/ISO 9001 certificates.

33. **Closing of Open Major and Minor Nonconformities Prior to QS-9000 Certification**
Each certification body/registrar can continue to use its accredited system of interim steps leading to certification, as long as the certification body/registrar has adopted the policy and practice that all major or minor audit nonconformities, as defined in **QSA**, are closed prior to granting **QS-9000** certification.

34. **No Certification Body/Registrar Endorsement**
All **QS-9000** certification bodies/registrars that are listed in the ASQ **QS-9000** Database (http://www.asq.org/9000) are considered **QS-9000** qualified by Chrysler, Ford and General Motors.

35. **Automotive Experience**
For the purpose of **QS-9000** the definition of an acceptable minimum criteria will remain with the accreditation body, but, must address the areas of work experience, audit experience, and education relative to the automotive industry.

36. **Registrar Encouragement to Pursue Registration**
Companies that do not meet the **QS-9000** Applicability criteria should not be encouraged by certification bodies/registrars to pursue registration to **QS-9000**, but rather should determine, and respond to, the requirements of their customers.

37. **IASG Role**
The IASG operates as the only group providing sanctioned **QS-9000** interpretations. As an ad hoc working group it consists at present of representatives from around the world; Chrysler/Ford/General Motors Supplier Requirements Task Force (Three), Chrysler, Ford and General Motors Recognized Accreditation Bodies (Four), **QS-9000** Qualified Certification Bodies/Registrars (Seven) and Tier 1 Automotive Suppliers (Two).

38. **Recognition of ISO 9000 Certificates from Other Certification Bodies/Registrars**
The IASG and IAAR anticipate that all **QS-9000** qualified certification bodies/registrars will recognize one another's accredited ISO 9000 certifications, and cooperate in helping the supplier achieve an effective compliance to **QS-9000**. If a **QS-9000** qualified certification body/registrar is contracted to assess for an upgrade from ISO 9000 to **QS-9000**, certification bodies/registrars will try to accept as much of the ISO 9000 certification body/registrar's assessment report as possible. The upgrade assessment shall address all **QS-9000** specific requirements.

39. **Use of Revised AVSQ, EAQF and VDA 6 Manuals**
It is acceptable for a supplier to use the revised AVSQ, EAQF or VDA6 manuals which include the **QS-9000** requirements for internal auditing and subcontractor development to satisfy **QS-9000** third-party registration requirements regarding elements 4.17 and 4.6.2.

40. **Notification of Suspension**

When a certification body/registrar places an existing **QS-9000** registered company on a suspension because of nonconformances or a violation of the rules of registration; the certification body/registrar shall notify, within 10 working days, each Chrysler/Ford/General Motors Supplier Quality Requirements Task Force representative of this action. These notifications are intended to remain confidential to the certification body/registrar, client, and the Chrysler, Ford, General Motors representatives.

This notification process is a requirement for all **QS-9000** qualified certification bodies/registrars, and **QS-9000** certified suppliers.

41. **Registrar Oversight**

QS-9000 recognized accreditation bodies shall:

- Conduct ongoing office assessments and witness audits, according to Table A below, using auditors with relevant automotive experience;
- Develop an audit schedule for these office assessments and witness audits of its qualified certification body/registrar offices taking into account all countries where **QS-9000** registrations are issued by each certification body/registrar.
- Schedule witness audits so as to observe as many different auditors as possible across all certification bodies/registrars;
- Send, upon request, audit schedules to Chrysler, Ford, or General Motors;
- Allow, upon request, Chrysler, Ford, or General Motors Supplier Quality Requirements Task Force representatives or their designees, to accompany accreditation bodies on witness audits of certification bodies/registrars, as automotive "Technical Expert Observers", if client permission is obtained; and if all potential issues regarding "confidentiality" and "conflict of interest" have been resolved.

The accreditation bodies are strongly encouraged to implement mutual recognition of each other's **QS-9000** office assessments and witness audits thereby using mutual recognition to satisfy the Table A requirements. It is expected this can occur for any visits greater than any minimum number each accreditation body may now require be conducted by themselves. The annual assessments defined below are not intended to create undue redundancy between accreditation bodies for any single **QS-9000** qualified certification body/registrar.

Table A
Annual Assessments by Accreditation Body of Certification Body/Registrar

	# QS-9000 CERTIFICATES IN FORCE (at the beginning of each calendar year)			
Minimum Number of Annual:	**1-30**	**31-100**	**101-250**	**251+**
Office Assessments*	1	1	1	1
Witness Audits**	1	2	3	4

*Office Assessments of the **QS-9000** qualified certification body/registrar are conducted at the site where their **QS-9000** records reside. Office Assessments shall review certification body/registrar compliance with all requirements of **QS-9000**, **QS-9000** Appendices and the **IASG Sanctioned QS-9000 Interpretations** (e.g. Timely notification of registrations and changes to ASQ).

Witness Audits are conducted by an accreditation body, at a client's site, observing an audit team from a certification body/registrar, during a **QS-9000 audit to verify certification body/registrar compliance with all requirements of **QS-9000**, **QS-9000** Appendices and the **IASG Sanctioned QS-9000 Interpretations**.

Appendix J: Control Plans

CONTROL PLAN

Page ___ of ___

☐ Prototype ☐ Pre-launch ☐ Production Control Plan Number		Key Contact/Phone	Date (Orig.)	Date (rev.)
Part Number/Latest Change Level		Core Team	Customer Engineering Approval/Date (If Req'd)	
Part Name/Description		Supplier/Plant Approval/Date	Customer Quality Approval/Date (If Req'd)	
Supplier/Plant	Supplier Code	Other Approval/Date (If req'd)	Other Approval/Date (If req'd)	

Part/ Process Number	Process Name/ Operation Description	Machine, Device, Jig, Tools For Mfg.	Characteristics			Special Char. Class.	Methods					Reaction Plan
			No.	Product	Process		Product/Process Specification/ Tolerance	Evaluation Measurement Technique	Sample Size	Sample Freq.	Control Method	

Glossary

Accreditation Body

An organization with authority, typically from the national government, to accredit bodies such as certification bodies/registrars for quality system certification, test laboratory accreditation, etc.

Accredited Laboratory

Accredited Laboratory is one that has been reviewed and approved by a nationally-recognized accreditation body [e.g. American Association for Laboratory Accreditation (A2LA) or the Standards Council of Canada (SCC)] for test laboratory accreditation to ISO/IEC Guide 25 or national equivalent.

Active Part

An active part is one currently being supplied to the customer for original equipment or service applications. The part remains active until tooling scrap authorization is given by the appropriate customer activity. For parts with no customer-owned tooling or situations where multiple parts are made from the same tool, written confirmation from the customer Purchasing activity is required to deactivate a part.

Activity

"Activity" can refer to departments, areas, processes, functions, etc. in a company (see 4.17).

Aftermarket Parts

Replacement parts not procured or released by OEM for service part applications which may or may not be produced to original equipment specifications.

Analysis of Motion/ Ergonomics

Ergonomics is the evaluation of the design of a product or process to assure compatibility with the capabilities of human beings. Analysis of motion refers to capabilities of people with respect to tasks (e.g. lifting, twisting, reaching) to prevent or relieve problems of strain, stress, excessive fatigue, etc. Factors involved include anatomical dimensions of the worker, placement of products to be worked upon, placement of buttons/switches, physical loads imposed on the worker, and environmental effects such as noise, vibration, lighting and space.

Approved Materials

Approved Materials are materials governed either by industry standard specifications (e.g. SAE, ASTM, DIN, ISO) or by customer specifications.

Assessment

An evaluation process including a document review, an on-site audit and an analysis and report. Customers may also include a self-assessment, internal audit results and other materials in the assessment.

Audit

An on-site verification activity based upon a sample used to determine the effective implementation of a supplier's documented quality system.

Benchmarking

A technique used to determine "best" practices for a particular process or product.

Calibration

A set of operations which compare values taken from a piece of inspection, measuring and test equipment or a gage to a known standard under specified conditions.

Capability

Capability is the total range of inherent variation in a stable process. It is determined using data from control charts. The control charts shall indicate stability before capability calculations can be made. Histograms are to be used to examine the distribution pattern of individual values and verify a normal distribution. When analysis indicates a stable process and a normal distribution, the indices Cp and Cpk can be calculated. If analysis indicates a non-normal distribution, advanced statistical tools, such as PPM analysis, will be required to determine capability. If control charts show the process to be non-stable, the index Ppk can be calculated (see **Statistical Process Control** reference manual).

Capability Indices (Cp, Cpk)

See **Statistical Process Control** reference manual.

Certification Body/ Registrar

For this document, a certification body/registrar is a qualified organization accredited by a national accreditation body to perform audits to the **QS-9000** and to register the audited facility for a given scope (e.g. commodity, process, etc.). Certification bodies/registrars shall meet the requirements of ISO/IEC Guide 62 and the IAF Guidance on the Application of ISO/IEC Guide 62, their national accreditation bodies, **QS-9000**, and the **IASG Sanctioned QS-9000 Interpretations**.

Computer-Aided Design (CAD)

The computer system capabilities that automate the creation and editing of geometry, dimensions and other drafting annotations which allow a user to define the shape and physical characteristics of an object.

Computer-Aided Engineering (CAE)

The use of computers to aid in the engineering process. These aids can produce engineering analysis Math Data sometimes used for simulation and finite element analysis.

Consulting

For the purposes of **QS-9000**, consulting is the provision of training, documentation development, or assistance with implementation of quality systems to a specific customer. If these activities are open to the public, advertised, and not customer specific, they are considered training rather than consulting. Other products, processes or services may be offered directly or indirectly, provided they do not compromise confidentiality or the objectivity or impartiality of its certification process or decisions [refer to IAF Guidance on the Application of ISO/IEC Guide 62, Issue 1, dated 2 June 1997 to ISO/IEC Guide 62:1996].

Control Charts (Variables, Attributes)

See **Statistical Process Control** reference manual.

Control Plans

Control Plans are written descriptions of the systems for controlling parts and processes. They are written by suppliers to address the important characteristics and engineering requirements of the product. Each part shall have a Control Plan, but in many cases, "family" Control Plans can cover a number of parts produced using a common process. See Section II for customer-specific requirements (see **Advanced Product Quality Planning and Control Plan** reference manual and **Production Part Approval Process** manual).

Corrective Action

Action taken to eliminate the causes of an existing nonconformity or other undesirable situation in order to prevent recurrence.
[Modified from ISO 8402]

Corrective Action Plan

A Corrective Action Plan is a document specifying actions to be implemented for correcting a process or part quality issue, with responsibilities and target dates assigned.

Cost of Poor Quality

The costs associated with production of nonconforming material. Typically, quality management breaks down these costs into two categories: internal failure and external failure. Typically, information available through normal business financial reporting should be sufficient to identify and manage the cost of poor quality. [Sometimes used interchangeably with Cost of Nonconformance (CONC).] See ISO 9004-1 for additional guidance.

Cumulative Sum Charting (CUSUM)

A cumulative sum (CUSUM) control chart is a plot of the cumulative sum of deviations of sample averages from a normally distributed mean that can detect small changes in the mean.

Design for Manufacturing (DFM)/ Design for Assembly (DFA)

A simultaneous engineering process designed to optimize the relationship between design function, manufacturability, and ease of assembly.

Design of Experiments (DOE)

An experimental technique used to manipulate process inputs in order to better understand their effects on process outputs. A designed experiment is a test or sequence of tests where potential influential process variables are systematically changed according to a prescribed design matrix. The response of interest is evaluated under the various conditions to: (1) identify the influential variables among the ones tested, (2) quantify the effects across the range represented by the levels of the variables, (3) gain a better understanding of the nature of the causal system at work in the process, and (4) compare the effects and interactions. Typical approaches to experimental design include “classical” and “Taguchi”.

Design Record

Engineering requirements, typically contained in various formats (e.g. engineering drawings, math data, referenced specifications).

Documentation

Material (typically paper or electronic) defining the process to be followed (e.g. quality manual, operator instructions, graphics, pictorials).

Due care

Reasonable care taken by the supplier at the time the product was designed or manufactured, to design or manufacture a product that is reasonably safe for its intended and foreseeable uses by those who might use, might be expected to use, or might be endangered by the product.

Engineering Approved Product Authorization (EAPA)

Written customer authorization that is required whenever the product or process varies from those currently customer approved (see **Production Part Approval Process** manual). This applies equally to products or services purchased from subcontractors.

Environment

Environment is all of the process conditions surrounding or affecting the manufacture and quality of a part or product. Environment will vary for each site, but generally includes: housekeeping, lighting, noise, HVAC, ESD controls, and safety hazards relating to housekeeping.

Failure Mode and Effects Analysis (FMEA)

A systematized group of activities intended to: 1) recognize and evaluate the potential failure of a product/process and its effects, 2) identify actions which could eliminate or reduce the chance of the potential failure occurring, and 3) document the process. See **Potential Failure Mode and Effects Analysis** reference manual.

Finite Element Analysis (FEA)

A technique for modeling a complex structure. When the mathematical model is subjected to known loads, the displacement of the structure may be determined.

Functional Verification

Functional Verification is testing to ensure the part conforms to all customer and supplier engineering performance and material requirements.

Geometric Dimensioning & Tolerancing (GD&T)

Geometric Dimensioning and Tolerancing is a set of rules and standard symbols used to define part features and relationships on an engineering drawing. GD&T depicts the geometric relationship of part features (instead of the Cartesian relationship), allowing the maximum tolerance which permits full function of the product.

Initial Process Study

Initial Process Studies are short-term studies conducted to obtain early information on the performance of new or revised processes relative to internal or customer requirements. In many cases, initial process studies should be conducted at several points in the evolution of new processes (e.g. at the equipment or tooling subcontractor's plant, after installation at the supplier's plant).

These studies should be based on variables data evaluated using control charts.

Job Instruction

Describes work conducted in one function in a company (e.g. setup, inspection, rework, operator) and considered to be level three (3) quality system documentation, (see page 6 and 4.9.1).

Laboratory

A laboratory is a test facility that may include chemical, metallurgical, dimensional, physical, electrical, reliability testing or test validation.

Laboratory Scope

A quality record (see 4.16) containing the following:

- the specific tests, evaluations and calibrations a supplier laboratory has the ability and competency to perform
- a list of the equipment which it uses to perform the above
- a list of the methods and standards to which it performs the above.

Last Off Part Comparison

Last Off Part Comparison is comparing the last part made in a production run with a part from the next production run to verify that the quality level of the new parts is at least as acceptable as that of the previous run.

Layout Inspection

Layout Inspection is the complete measurement of all part dimensions shown on the design record. A layout inspection may be required by some customers for all products annually unless another frequency is established in a customer approved control plan.

Match Check

Match Check is a design check and tryout of dimensionally correct parts from production tooling to ensure that they fit together and can be used to build assemblies and vehicles to design specification and intent.

Mistake Proofing

The use of process or design features to prevent manufacture of nonconforming product.

Multi-Disciplinary Approach

Any activity where a group of individuals is consulted to complete a task or activity. A multi-disciplinary approach seeks to have all relevant knowledge and skills available to the decision making process. The term multi-disciplinary is synonymous with the term "cross-functional." Certain activities may call for the convening of a meeting.

Nonconformance

Nonconformance is product or material which does not conform to the customer requirements or specifications.

Nonconformity

Nonconformity is a process which does not conform to a quality system requirement.

Overall Equipment Effectiveness

The product of three measurements: Availability x Performance Efficiency x Yield; where Availability is the percentage of time the machinery is available, Performance Efficiency is how fast the machinery or equipment is running relative to its design cycle, and Yield is the percentage of the resulting product within quality specifications. [from Reliability and Maintainability Guideline for Manufacturing Machinery and Equipment].

Parts Per Million (PPM)

PPM is a method of stating the performance of a process in terms of actual nonconforming material. PPM data can be used to prioritize corrective actions. Definition of defective units varies with customer (e.g. all sorted, only those found to be wrong, all in box).

Performance Indices (Pp, Ppk)

See **Statistical Process Control** reference manual.

Preventive Action

Action taken to eliminate the causes of a potential nonconformity or other undesirable situation in order to prevent occurrence.
[Modified from ISO 8402]

Problem Solving

A disciplined process to analyze problems to determine and eliminate root causes. Customer-specific requirements include Chrysler's 7 Step Process, Ford's 8-D, and General Motors' PR&R (GP-5).

Procedures

Documented processes that are normally used when work affects more than one function or department of an organization. Procedures are considered to be level two (2) quality system documentation, (see page 6 and 4.2.2).

Process Capability

See **Capability**.

Process Flow Diagram

A depiction of the flow of materials through the process, including any rework or repair operations. Also called a process flow chart.

Production Materials

Materials which have been issued a production part number by the customer and are shipped directly to the customer.

Quality Function Deployment (QFD)

A structured method in which customer requirements are translated into appropriate technical requirements for each stage of product, development and production.

Quality Manual

Quality Manual is the supplier's document that describes the elements of the quality system used to assure customer requirements, needs, and expectations are met. The Quality Manual is considered to be level one (1) Quality Systems Documentation, (see page 6 and 4.2.1).

Quality Plan

A document setting out the specific quality practices, resources and sequence of activities relevant to a particular product or contract. While control plans are Quality Plans, the Quality Plan is a broader concept. See ISO 9004-1, 5.3.3 for more information.

Quality Planning

Quality Planning is a structured process for defining the methods (i.e., measurements, tests) that will be used in the production of a specific product or family of products (i.e., parts, materials). Quality planning embodies the concepts of defect prevention and continuous improvement as contrasted with defect detection (see **Advanced Product Quality Planning and Control Plan** reference manual).

Quality Records

Quality Records are the documented evidence that the supplier's processes were executed according to the quality system documentation (e.g. inspection and test results, internal audit results, calibration data) and records results.

Raw Data

Raw Data is test data that is gathered or taken by the technician/analyst at the time that the time the test is being run. It is generally not edited or manipulated in any fashion. It is often recorded in a notebook, etc. It is different from the results which are reported, in that the reported results usually involve editing, transformations, and/or other manipulations of the raw data for analysis and presentation.

Reaction Plan

A Reaction Plan is the action specified by a Control Plan, or other quality system documentation, to be initiated when nonconforming product or process instability is identified.

Registered Suppliers/ Subcontractors

Registered Suppliers/Subcontractors are suppliers/subcontractors who have received third party registration/certification to a specific quality system standard for a specific scope.

Registrar

See **Certification Body/Registrar**.

Remote Location

A remote location is a location at which production processes do not occur, e.g. which does not fit the definition given for **Site**, but which support such sites. See Applicability, page 2.

Repair

Action taken on nonconforming product so that the product will fulfill the intended usage although the product may not conform to the original requirements.

Rework

Action taken on nonconforming product so that it will meet the specified requirements.

Scope - Laboratory

See **Laboratory Scope**.

Service Parts

Replacement parts manufactured to OEM specifications which are procured or released by the OEM for service part applications.

Setup Verification

A recommended method is to produce enough product to constitute a subgroup of the size used for SPC. The parts are measured and the results are entered on the control chart. If these results fall within the central third of the control limit zone, the setup can be approved for production. If the results fall in the outer two thirds, a second subgroup should be manufactured, measured, and plotted. If this point falls in the same outer two thirds, the setup should be adjusted and this sequence repeated. If the point falls in the central third, the setup can be approved for production.

Simulation Techniques

The practice of mimicking some or all of the behavior of one system with a different, dissimilar system.

Site

Site is defined as a supplier or subcontractor location at which value-added production processes occur. "Site" also includes distributors of parts manufactured by other companies. External locations which only stage materials for onward shipment are exempted from **QS-9000** registration (e.g. sequencers). The definition does not include suppliers of indirect materials or vehicle assembly plants. Providers of bulk or raw materials should contact the procuring division buyer to determine if their material is considered to be production material.

Solid Modeling

A geometric **CAD** technique which adds volumetric physical properties to product design, which permits automated geometric and physical properties analysis.

Special Characteristics

See Appendix C.

Statistical Process Control

The use of statistical techniques such as control charts to analyze a process or its outputs so as to take appropriate actions to achieve and maintain a state of statistical control and to improve the process capability.

Subcontractors

Subcontractors are defined as providers of production materials, or production or service parts, directly to a supplier to Chrysler, Ford, General Motors or other customers subscribing to this document. Also included are providers of heat treating, painting, plating or other finishing services. See **Site**.

Subcontractor Development

Subcontractor development refers to all activities designed to improve the fundamental quality system performance of the **subcontractor**.

Suppliers

Suppliers are defined as providers of: a) production materials, b) production or service parts, or c) heat treating, plating, painting or other finishing services, directly to Chrysler, Ford, General Motors or other customers subscribing to this document. See **Site**.

Suspect Material or Product

Any material or product where the inspection and test status is uncertain.

Theory of Constraints

A manufacturing philosophy intended to help organizations increase the positive impact of "change efforts" focused on continuous improvement by identifying and addressing anything (frequently policy roadblocks or "old ways," not machines or physical barriers) that limits performance (i.e., constraints) related to a stated goal or objective.

Tool

The portion of process machinery which is specific to a component or sub-assembly. Tools (or tooling) is used in process machinery to transform raw material in to a finished part or assembly.

Validation

Confirmation by examination and provision of objective evidence that the particular requirements for a specific intended use are fulfilled.

Value Added Production Process

Activities or operations for which a customer would be willing to pay, if given the option.

Value Analysis (VA)

Value analysis is a method for analyzing a product or process in order to reduce costs. The method uses a systematic format for eliminating nonessential functions (those not adding value) thus reducing overall cost. When this method is used during the early design and development phases it is generally referred to as value engineering.

Value Engineering (VE)

A planned, clean sheet approach to problem solving, focusing on specific product design and process characteristics. Where value analysis is employed to improve value after production has begun, value engineering is employed to maximize value prior to expenditures of facilities and tooling money.

Verification

Confirmation by examination and provision of objective evidence that specified requirements have been fulfilled.

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Contact Information

If you have suggestions for improvements of the **Quality System Requirements QS-9000**, please contact:

Chrysler
Hank Gryn
CIMS: 484-00-42
800 Chrysler Drive East
Auburn Hills, MI 48326-2757
FAX: 01-248-512-1423

Ford
Steve Walsh
Process Leadership HQ
Building A / 5E27
1333 Fairlane Circle
Allen Park, MI 48101
FAX: 01-313-322-9778

General Motors
R. Dan Reid
Mid/Lux Car Group
Engineering & Development Centre
4100 S. Saginaw Street
Flint, MI 48557
mail stop 485-303-303, B-34506
FAX: 01-810-236-6781

Further copies are obtainable from AIAG at 01-248-358-3003