

Quality Systems  
- Aerospace -  
Model for Quality Assurance  
in Design, Development, Production, Installation and Servicing

FOREWORD

In December 1998, the Aerospace Industry had established the International Aerospace Quality Group (IAQG) with the purpose of achieving significant improvements in quality and reductions in cost throughout the value stream.

This organization, with representation from Aerospace companies in Americas, Asia and Europe and sponsored by SAE, SJAC, and AECMA has agreed to take responsibility for the technical contents of this standard.

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1. SCOPE:

***This standard includes ASQ 9001:1994 quality system requirements and specifies additional requirements for the quality system of the aerospace industry.***

***For those not involved in design activities (Ref. ASQ 9002), 4.4 is not applicable.***

***It is emphasized that the quality system requirements specified in this standard are complementary (not alternative) to the contractual and applicable law and regulatory requirements.***

2. NORMATIVE REFERENCES:

The following standard contains provisions which, through reference in this text, constitute provisions of this document. At the time of publication, the edition indicated was valid. All standards are subject to revision, and parties to agreements based on this document are encouraged to investigate the possibility of applying the most recent edition of the standard indicated below. Members of IEC (***International Electrotechnical Commission***) and ISO (***International Organization for Standardization***) maintain registers of currently valid International Standards.

ANSI/ISO/ASQC Q9001:1994; Quality Systems - Model for Quality Assurance in Design, Development, Production, Installation and Servicing (a word-for-word equivalent to ISO9001) has been reproduced in this document with the permission of the American Society for Quality. The complete standard can be obtained from the American Society for Quality, 611 E. Wisconsin Ave., Milwaukee, WI 53202. Copyright remains with the American Society for Quality.

ISO 8402:1994 Quality management and quality assurance - Vocabulary

ISO 9001:1994 Quality systems - Model for quality assurance in design, development, production, installation and servicing

Notes are for guidance only and are not a part of the requirements of the document.

NOTE 1: For informative references, see Annex A.

### 3. DEFINITIONS:

For the purposes of this document, the definitions are given in the International Standard ISO 8402 and the following definitions apply.

#### 3.1 PRODUCT:

Result of activities or processes

##### NOTES:

- 2: A product may include service, hardware, processed materials, software or a combination thereof.
- 3: A product can be tangible (e.g., assemblies or processed materials) or intangible (e.g., knowledge or concepts), or a combination thereof.
- 4: For the purposes of this document, the term “ product ” applies to the intended product offering only and not to unintended “ by-products ” affecting the environment. This differs from the definition given in ISO 8402.

#### 3.2 TENDER:

Offer made by a supplier in response to an invitation to satisfy a contract award to provide product.

#### 3.3 CONTRACT:

Agreed requirements between a supplier and customer transmitted by any means.

#### 3.4 KEY CHARACTERISTICS:

***The features of a material or part whose variation has a significant influence on product fit, performance, service life, or manufacturability.***

### 4. QUALITY SYSTEM REQUIREMENTS:

NOTE: ***This clause reproduces<sup>1</sup> clause 4 of ASQ 9001:1994. Additional International Aerospace Industry requirements are shown in italics and bold.***

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1. With the permission of the American Society for Quality (ASQ). The complete standard may be obtained from ASQ, 611 E. Wisconsin Ave., Milwaukee, WI 53202.

4.1 Management Responsibility:

- 4.1.1 Quality Policy: 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.

4.1.2 Organization:

- 4.1.2.1 Responsibility and Authority: 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 the product, process and quality system;
- 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.

- 4.1.2.2 Resources: 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.

- 4.1.2.3 Management Representative: 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 document, 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.

***The Management representative shall have the necessary authority and organizational freedom to resolve matters pertaining to quality.***

4.1.2.4 Process Performer: ***Suppliers having a quality assurance activity performed by an individual process performer (e.g., operator, buyer, planner) shall have procedures that define the specific tasks and responsibilities that are authorized and the corresponding requirements and training necessary to perform those tasks.***

4.1.3 Management Review: 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 document and the supplier's stated quality policy and objectives (see 4.1.1). Records of such reviews shall be maintained (see 4.16).

#### 4.2 Quality System:

4.2.1 General: 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 document. 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.

***Other Quality System requirements imposed by the applicable Regulatory Authorities shall be included or referenced in the Quality System documentation.***

4.2.2 Quality System Procedures: The supplier shall:

- a. prepare documented procedures consistent with the requirements of this document and the supplier's stated quality policy;
- b. effectively implement the quality system and its documented procedures;
- c. ***ensure that quality system procedures are readily accessible to personnel who are responsible for performing work in conformance to requirements, and to customer and/or regulatory authorities representatives.***

For the purposes of this document, 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.

4.2.3 Quality Planning: 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; ***the design, manufacture, and use of tooling so that variable measurements can be taken, particularly for key characteristics;***
- 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; ***the identification of in-process verification points when adequate verification of conformance cannot be performed at a later stage of realization;***
- 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);
- i. ***the identification and selection of subcontractors;***
- j. ***the establishment of appropriate process controls and development of control plans where key characteristics have been identified;***
- k. ***the identification of material, processes and services to support operation and maintenance of the product.***

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.

- 4.2.4 Configuration Management: ***The supplier shall establish, document and maintain a configuration management process appropriate to the product.***

NOTE: ***Guidance on configuration management is given in ISO 10007.***

4.3 Contract Review:

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

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

- 4.3.2 Review: Before 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 the contract or order requirements;
- d. ***risk associated with new technology and/or short delivery time scale have been evaluated.***

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

***Contract review requirements shall also apply to contract amendment.***

- 4.3.4 Records: 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.

4.4 Design Control:

- 4.4.1 General: 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.

***The responsibilities and authorities for the approval of the design data shall be defined.***

***When the supplier subcontracts design or development activities, the supplier shall control the subcontracted activity consistent with the requirements of paragraph 4.4.***

- 4.4.2 Design and Development Planning: 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.

- 4.4.2.1 Design and Development Management Planning: The supplier shall plan the different phases used to carry out the design and development, in respect of the organization, task sequence, mandatory steps, significant stages and method of configuration control.**

***The supplier shall give consideration to the following activities as appropriate:***

- ***structure the design effort into significant elements according to the complexity,***
- ***for each element analyze the tasks and the necessary resources for its design and development. (This analysis shall consider an identified responsible person, design content, planning constraints, and performance conditions).***

- 4.4.2.2 Reliability, Maintainability, Safety: The different design and development tasks to be carried out shall be defined according to specified safety or functional objectives of the product in accordance with customer and/or regulatory authority requirements.**

- 4.4.3 Organizational and Technical Interfaces: Organizational and technical interfaces between different groups which input into the design process shall be defined and the necessary information documented, transmitted and regularly reviewed.