TITLE

Supplier Quality System Requirements

INTRODUCTION

This specification defines supplier quality requirements as agreed upon by the following business entities herein referred to as "Member".

Business Entity	Identifier
Hamilton Sundstrand	HS
Pratt & Whitney	PW
Pratt & Whitney Canada	PWC
Sikorsky Aircraft	SAC

This specification applies to OEM aerospace suppliers and their subcontractors who furnish product, material, processes, or services (as a manufacturer or maintenance provider) to any of the above members as a contract requirement regardless of supplier's industry, regulatory accreditation, or certification status.

Members reserve the right to flow down additional requirements to satisfy specific customer and / or business requirements that will apply only to the Member.

Each Member has the individual right to disapprove a supplier's Quality System as well as the Quality System of their subcontractors.

This document employs, as a foundation, SAE Aerospace Standard (AS) 9100 requirements and is supplemented by Member requirements as defined herein. In an effort to standardize the use and application of the common quality system requirements, the SAE AS 9100 paragraph numbering scheme has been used.

Each member, their representatives, and their customer's government/regulatory agencies shall have the right of entry into a supplier's facility or that of their subcontractors. Entry shall provide for access to quality system documentation, quality records as well as the ability to conduct audits, verify product and processes.

REVISION SUMMARY

This document has been completely revised. Major changes include:

- Introduction: Removed "UTC Power" from Business Entity listing
- Introduction: Added "OEM aerospace" before suppliers and reorganized paragraphs
- ANSI/NCSL Z540.3, Requirements for the Calibration of Measuring and Test Equipment, supersedes ANSI Z540-1 throughout document
- Editorial changes to align with AS9100C numbering conventions.

Existing Paragraph Number	Moved to Paragraph Number
4.3 Configuration Management	7.1.3
7.5.1.4 Control of Work Transfers	7.1.4
8.2.4.1 Inspection Documentation	8.2.4
8.2.4.2 First Article Inspection	7.5.1.1

- Paragraph 1.5: Added Members reserve the right to input significant/frequent product escape data and major audit findings regarding suppliers into the OASIS database
- Paragraph 4.2.3: Replaced words "signed in ink" with "traceable to the originator (e.g., signature, stamp, etc.)"
- Paragraph 4.2.4: Record retention requirement changed from 4 years to 5 years per revised FAR Part 21 requirement
- Paragraph 6.2.2: Visual inspection requirement of Jaeger 2 at 14 inches changed to "Jaeger 2 not less than 12 inches"
- Paragraph 7.2.3: Delete reference to "contractual requirements"
- Paragraph 7.4.3: Added language from AS9100B regarding test reports.
- Paragraph 7.5.1.1: Added requirement for UTC Production Part Approval Process and relocated FAI requirements from paragraph 8.2.4.2
- Paragraph 8.2.2: Added "including customer unique requirements, i.e. ASQR-01"
- Paragraph 8.5.2 added "a minimum of" and " unless otherwise specified by the Member"

TABLE OF CONTENTS		
SECTION		**PAGE**

QUALITY MANAGEMENT SYSTEMS - REQUIREMENTS

1 SCOPE

1.1 General: No Additional Requirements

1.2 Application

Suppliers and all members of their supply chain that provide Member product shall be compliant to all applicable Quality Management System and ASQR-01 requirements.

1.2.1 Suppliers who receive a purchase order from a Member company shall be certified / registered to the Quality Management Systems - Aerospace - Requirements of AS/EN/JISQ 9100.

1.2.2 Stocklist Distributors or organizations carrying out the purchase, storage, splitting and sale of products without affecting product conformance shall be certified / registered to AS/EN/JISQ 9100 or Quality Management Systems - Aerospace Requirements for Stocklist Distributors AS/EN/JISQ 9120.

1.2.3 Suppliers and all members of their supply chain that only provide special processes (not part manufacturing suppliers) that receive a purchase order from a Member may be accredited to Nadcap AC7004 in lieu of AS/EN/JISQ 9100.

1.3 Supplier Certificate(s) of Registration to applicable Aerospace Quality Management System (AQMS) assessments must be issued by a Certification Registration Body (CRB).

The CRB must be accredited under the control of the International Aerospace Quality Group (IAQG) certification/registration schemes, as recognized by the Aerospace Standard SAE AS 9104. Reference the IAQG website for a listing of accredited CRBs.

Note: *You will need to register on the IAQG website and receive a password in order to view the list of accredited CRBs.*

1.4 Other party Certificate(s) of Registration or Nadcap Accreditation Certificates/documentation must be submitted to each Member that issued a purchase order if information has not been entered into the OASIS or Nadcap databases.

1.5 Suppliers shall permit Members access to all data in OASIS and Nadcap databases including registration documentation, certification, audit reports, findings, corrective actions, etc. Members reserve the right to input significant and/or frequent escape data and major audit findings regarding suppliers into the relevant OASIS data base records for those Suppliers.

1.6 The supplier is responsible to provide each Member with notification of any changes in the certification / registration / accreditation or major audit findings within (2) business days of receiving notification of the change or finding. Examples of changes in registration include new certification, suspension, or expiration.

1.7 Suppliers not certified / registered / accredited are subject to removal from the Qualified Supplier List. If the Member elects to continue a business relationship with the supplier, the supplier is subject to QMS and / or Special Process audits by Members. Suppliers may be required to reimburse the Member company for the cost of conducting these audits until certification / registration / accreditation is achieved.

2 NORMATIVE REFERENCE

2.1 It is the responsibility of the supplier to ensure that they are working to the latest version of specifications referenced within this document as well as purchase order requirements.

2.2 Requests for Member–specific specifications that are needed shall be requested from the applicable Member's Procurement department.

2.3 Supplier shall refer to the Specification Revision List date or the specification revisions identified on the Purchase Order to determine the revision of the specification that applies.

2.4 It is the responsibility of the supplier to obtain copies of non Member documents specified by this ASQR. These documents include, but may not be limited to, the following:

Document	Available From
ISO STANDARDS	Canadian Source Standards Council of Canada 350 Sparks Street Ottawa, Ontario K1R 7S8, Canada
	American Source American National Standards Institute 11 West 42nd Street New York, New York 10036 U.S.A.
	European Source International Organization for Standardization Case Oistake 56 CH-1211 Geneve 20 Switzerland
	Asian Source The Society of Japanese Aerospace Companies (SJAC) Toshin Tameike Bldg.2nd Floor, 1-1-14 Akasaka, Minato-ku, Tokyo 107-0052 Japan
SAE SPECIFICATIONS	Society of Automotive Engineers 400 Commonwealth Drive Warrendale, PA 15096-0001, U.S.A.
ANSI SPECIFICATIONS	American Society for Quality 611 East Wisconsin Avenue Milwaukee, WI 53201-3005, USA
AWS SPECIFICATIONS	American Welding Society 550 N.W. LeJeune Road Miami, FL 33126
AEROSPACE INDUSTRIES ASSOCIATION NAS STANDARDS	Aerospace Industries Association of America, Inc. 1250 Eye Street, N.W. Washington, D.C. 20005

INFORMATION SPECIFICATIONS REFERENCED IN THIS DOCUMENT

Document	Title
AIA/NAS 410	National Aerospace Non-Destructive Test Project Group
ANSI/NCSL Z540.3	Requirements for the Calibration of Measuring and Test Equipment
ASQR-07.5	Control of Software
ASQR - 09.1	Flight Safety Parts Program
ASQR-09.2	UTC Production Part Approval Process (UPPAP)
ASQR - 15.1	Foreign Object Damage/Debris Prevention, Handling, Storage, Packaging, Preservation and Delivery
ASQR - 20.1	Supplier Sampling Requirements
AWS D17.1	Specification for Fusion Welding for Aerospace Applications
ISO 10012	Quality Assurance Requirements for Measuring Equipment
ISO 17025	General Requirements for the Competence of Testing and Calibration Laboratories
PRI AC 7004	Nadcap Audit Criteria For Inspection and Test Quality System
SAE AS 9100	Quality Management Systems - Aerospace - Requirements
SAE AS 9102	Aerospace First Article Inspection Requirement
SAE AS 9104	Requirements for Aerospace Quality Management System Certification/Registration Programs
SAE AS 9120	Quality Management Systems - Aerospace Requirements for Stocklist Distributors
UTCQR - 09.1	Process Certification Requirements

FORMS REFERENCED

Form	Title
ASQR-01 Form 3	Supplier Request for Information

3 TERMS AND DEFINITIONS

No Additional Requirements

4 QUALITY MANAGEMENT SYSTEM

4.1 General Requirements: No Additional Requirements

4.2 Documentation Requirements:

4.2.1 General: No Additional Requirements

4.2.2 Quality Manual: No Additional Requirements

4.2.3 Control of Documents:

a) No Additional Requirements

b) Corrections to work instructions or documents must be recorded, dated and traceable to the originator (e.g., signature, stamp, etc.) in ink or other permanent marking method with the original data being legible and retrievable after the change.

c-d) No Additional Requirements

e) All quality records (non–electronic) shall be documented in ink or other permanent marking.

f-g) No Additional Requirements

4.2.4 Control of Records:

1) Electronic imaging/microfilming of records in lieu of storing actual inspection records is permissible. All electronic records must be controlled, retained, and retrievable per the same requirements identified for hard copy records. For electronic records that are transferred from computer files, the storage media must be capable of maintaining the data integrity for the full retention period.

Examples of Quality Records to be retained are, but not limited to:

- Deliverable and non-deliverable software verification & validation
- First article inspection reports
- In process / final inspection & test records
- Training records
- Manufacturing / fabrication records (e.g., planning sheets, routers, etc.,)
- Nonconforming material disposition
- Procurement documents (supplier placed orders)
- Process control records (used as acceptance criteria)
- Radiographs, technique sheets and related acceptance reports
- Receiving inspection records (e.g., test reports, material certifications, etc.)

2) Retain Quality Management System (QMS) records as identified per AS9100. The following identified quality records shall be maintained for the minimum retention periods specified below:

Time Period	Description
40 years from time of manufacture	Flight safety, critical / major rotor parts (i.e., turbine and compressor disks, hubs, shafts, free turbine couplings and turbine disk side plates), serialized major engine (cast / fabricated) cases (i.e., inlet, fan, compressor, intermediate, diffuser, combustion, turbine and exhaust cases) and main shaft bearing supports, which are not integral to a major case.
30 years	Manned Space Program Hardware
10 years	All other parts except off–the–shelf industry standard parts.
5 years	Off-the-shelf / industry standard parts (e.g., AN, AS, MS, JAN, etc.)

3) Radiographs: The Supplier shall retain radiographs.

Time Period	Description
40 years	Flight safety, Critical / major rotor parts (i.e., turbine and compressor disks, hubs, shafts, free turbine couplings and turbine disk side plates), Serialized major engine (cast / fabricated) cases, (i.e., inlet fan, compressor, intermediate, diffuser, combustion, turbine and exhaust cases), and main shaft bearing supports which are not integral to a major case and engine components traceable by Engineering Drawing / Quality Assurance Data required serial numbers.
10 years	Castings or parts where the purchase order, engineering drawing or specifications require serial number traceability. Castings or parts where the purchase order, engineering drawing or specifications do not require serial number traceability, shall be retained only if no other inspection record is retained that documents completion and final acceptance of radiographic inspection.
5 years	Military hardware - turbine airfoil (blades) casting radiographs for initial casting quality. Military hardware - Radiographs of airfoils for the presence of foreign material need not be retained provided an inspection record is retained that documents completion and final acceptance of radiographic inspection.

5 MANAGEMENT RESPONSIBILITY

5.1 Management Commitment: No Additional Requirements

5.2 Customer Focus: No Additional Requirements

5.3 Quality Policy: No Additional Requirements

5.4 Planning: No Additional Requirements

5.5 Responsibility, Authority and Communication: No Additional Requirements

5.6 Management Review: No Additional Requirements

6 RESOURCE MANAGEMENT

6.1 Provision of Resources: No Additional Requirements

6.2 Human Resources

6.2.1 General: No Additional Requirements

6.2.2 Competence, Training and Awareness:

a) Unless otherwise specified, procedures shall be implemented to ensure that eye examinations, including visual acuity and color vision, as applicable, are administered by a medically qualified / trained person to all individuals performing visual inspection and/or other product acceptance activities that require visual acuity.

- Intervals shall not exceed one year.
- Individuals shall be tested in at least one eye, either corrected or uncorrected.
- Color Perception testing is required one time only. Individuals shall be capable of adequately distinguishing and differentiating colors used in the method for which certification is required, the process being performed or inspection activity. Documentation shall be retained.
- Records shall be retained for each individual.

Individual performing …	**Shall be compliant with …**
Visual inspection (i.e. calibration, non-weld, in-process, layout, dimensional)	Near vision requirements of • Snellen 14/18, (20/25), • Jaeger 2 at not less than 12 inches
Visual Inspections on Welds	American Welding Society Standard (AWS) D17.1
Nondestructive Testing (NDT)	Aerospace Industries Association National Aerospace Standard (AIA/NAS) 410
Note: *Vision tests may be substituted for the options listed above providing the equivalence is verified and documented by a licensed optometrist.*	

b-e) No Additional Requirements

6.3 Infrastructure: No Additional Requirements

6.4 Work Environment: No Additional Requirements

7 PRODUCT REALIZATION

7.1 Planning of Product Realization: No Additional Requirements

7.1.1 Project Management : No Additional Requirements

7.1.2 Risk Management : No Additional Requirements

7.1.3 Configuration Management : No Additional Requirements

7.1.4 Control of Work Transfers: No Additional Requirements

7.2 Customer–Related Processes:

7.2.1 Determination of Requirements Related to the Product: No Additional Requirement

7.2.2 Review of Requirements Related to the Product:

a) Verbal agreements or instructions shall under no circumstances be construed as approval or authorization to proceed.

b-e) No Additional Requirements

7.2.3 Customer Communication:

a) Changes that may affect quality must be documented and communicated to the applicable Member(s) Quality Assurance and/or Procurement Representative prior to effectivity of the change.

EXAMPLE OF CHANGES

- Ownership
- Manufacturing location
- Process
- Product
- Inspection Techniques

b) Supplier Request for Information (SRI), ASQR-01 Form 3, is available as a formal communication process, which is submitted to applicable Procurement personnel.

SRIs may be used for items such as:

- An anomaly noted in a drawing or specification that could result in a nonconformance.
- For clarification / interpretation of a drawing or specification not requiring formal approval.
- A request for an alternate method to a quality system requirement. Any alternate methods to a quality system requirement must receive approval from the applicable Member prior to incorporation.

Note: *SRIs are not used for processing product nonconformances.*

c) All communications between the supplier and the Member must be written in the English language. These communications include Quality Systems Manual and Procedures and process documentation which require approval or source qualification by the Member.

1. In cases where the supplier maintains copies in their native language as well as in English and there is a conflict, the English language document shall take precedence.
2. Provide Member Supplier Quality Assurance (SQA) with a company owned e–mail address to permit communications with the supplier's quality department. The e–mail address and any changes shall be sent to the applicable Member SQA organization.

7.3 Design and Development: No Additional Requirements

7.4 Purchasing:

7.4.1 Purchasing Process:

a-c) No Additional Requirements

d) When specified on the drawing or purchase order, suppliers must use only sources approved by the specific Member company to perform special processes (each special process supplier must obtain initial approval from each specific Member company).

Note: *The use of directed sources does not relieve the responsibility for subcontractor control (i.e., an approved source for Non-Destructive Testing, Plating, Coating, etc.).*

e-f) No Additional Requirements

7.4.2 Purchasing Information:

a-f) No Additional Requirements

g) Where a Member owns the design of an article purchased from a supplier (first–tier) who further subcontracts all or portions of that work to other subcontractors (second–tier), the first–tier supplier's purchase order must state that the articles are for applicable Member's "end use" and must be controlled per applicable purchase order requirements..

h-j No Additional Requirements

7.4.3 Verification of Purchased Product:

1) Suppliers must provide raw materials test reports / certification results / laboratory analysis requirements (e.g., tensile strength, stress rupture, hardness, chemical composition, etc.), as defined by the product definition and/or the purchase order.
2) Where the supplier utilizes test reports to verify purchased product, the data in those reports shall be acceptable per applicable specifications. The supplier shall periodically validate test reports for raw material.
3) Upon receipt of a Member purchase order requiring Government oversight (e.g., Government Contract Quality Assurance (GCQA), Department of Energy, (DOE), etc.) notify the Government Representative who services your facility or if there is none, the Government Inspection office nearest to your facility.

7.5 Production and Service Provision:

7.5.1 Control of Production and Service Provision:

a) 1) Flight Safety Parts: The requirements for Flight Safety Parts are contained in ASQR-09.1 and apply when invoked by drawing, drawing related documents or Purchase Order.
Note: For the purpose of this document the term Flight Safety Part (FSP) is synonymous with PW Prime Reliable Part, PWC Critical Part, PWC Critical Rotating Part, PWC Engine Structural Integrity Program (ENSIP) Critical Part, and Hamilton Sundstrand Flight Safety Part.

2) Process Certification: Suppliers shall implement Process Certification per the requirements contained in UTCQR-09.1.

b-e) No Additional Requirements

f) Product identified with Member acceptance symbols can only be shipped to the Member or a Member approved destination.

g-k) No Additional Requirements

7.5.1.1 Production Process Verification:

1) First Article Inspections (FAI) shall be performed in accordance with SAE AS 9102 and the additional requirements below:
   - A full or partial FAI shall be performed for affected characteristics when any of the following occurs:
     - Change in design
     - Change in manufacturing source(s), process(s), inspection method(s), locations of manufacture, tooling or materials.
     - Change in numerical control program or translation to another media.
     - Natural or man-made event, which may adversely affect a manufacturing process.
     - Lapse in production for two years or as specified by the customer.
   - A replication of product part marking (via photograph or sample) that represents production marking must be included within the FAI Report
   - The Supplier holding the Member purchase order is responsible for assuring completion of the FAI Report for all finished part characteristics generated by sub–tier suppliers.

- At any time, a Member may request a complete FAI to be performed in lieu of a partial (delta) FAI.
- Additional requirements for AS 9102 FAI Form 1:
  - ***Field 11, Supplier Code:*** Record Member assigned Supplier Code.
  - ***Field 12, P.O. Number:*** Record Member Purchase Order Number.
- Additional requirements for AS 9102 FAI Form 3:
  - ***Field 14, for each characteristic:*** Record FAI Inspection Measuring Equipment used as a media of inspection. Record FAI inspector identification (e.g., signature, stamp, electronic authorization, etc.) used to signify the person that accomplished the inspection.

2) UTC Production Part Approval Process: Suppliers shall implement the UTC Production Part Approval Process per the requirements contained in ASQR-09.2 when invoked by drawing related documents, purchase order, or any other contractual requirement.

7.5.1.2 Control of Production Process Changes: No Additional Requirements

7.5.1.3 Control of Production Equipment, Tools and Software Programs:

Suppliers shall, for control of software, implement requirements per ASQR-07.5.

7.5.1.4 Post-Delivery Support: No Additional Requirements

7.5.2 Validation of Processes for Production and Service Provision:

a) Suppliers and all members of their supply chain shall use Member approved suppliers when a specific material or manufacturing special process is identified by individual Member.
Suppliers and all members of their supply chain that only provide special processes (not part manufacturing suppliers) must be Nadcap accredited for the following special processes:

- Brazing
- Chemical Processing
- Coatings
- Heat Treating
- Materials Testing
- Nonconventional Machining
- Nondestructive Testing
- Shot Peening
- Welding

Nadcap requirements may be further defined by the Member.

Note: *Nadcap accreditation is not required for materials testing laboratories with American Association for Laboratory Accreditation (A2LA).*

b-e) No Additional Requirements

7.5.3 Identification and Traceability: No Additional Requirements

7.5.4 Customer Property:

Return all documents, records, gaging, stamps, or other customer supplied product upon written notification from Member or when business with the Member has ceased.

7.5.5 Preservation of Product:

The requirements for Foreign Object Damage/Debris Prevention, Handling, Storage, Packaging, Preservation and Delivery are contained in ASQR-15.1.

7.6 Control of Monitoring and Measuring Equipment:
Calibration Systems shall meet the applicable requirements of ISO 10012, ISO 17025 or ANSI/NCSL Z540.3.

If ANSI/NCSL Z540.3 is applicable, the Handbook shall be used as the interpretive guide.

a) In accordance with the industry standards and guidance referenced above, stated reliability goals, accuracy ratios and Significant–Out–Of–Tolerance condition criteria must be established.
   1) The Calibration interval analysis methodology used to maintain the reliability of Measuring and Test Equipment (M&TE) shall have a stated reliability goal to meet a minimum 95% reliability target for M&TE in–tolerance at the end of their interval schedule.
   2) Significant–Out–Of–Tolerance conditions are defined as any M&TE out–of–tolerance condition exceeding 25% of the product tolerance. These conditions require documented review of impact on quality and notification to the Member if product received by the Member has been affected.

b-e) No Additional Requirements

8 MEASUREMENT, ANALYSIS and IMPROVEMENT

8.1 General: No Additional Requirements

8.2 Monitoring and Measurement:

8.2.1 Customer Satisfaction: No Additional Requirements

8.2.2 Internal Audit:

Audits of the entire Quality Management System, including customer unique requirements, i.e. ASQR-01, must be conducted annually. Alternate plans may be accepted by the Member.

a-b) No Additional Requirements

8.2.3 Monitoring and Measurement of Processes: No Additional Requirements

8.2.4 Monitoring and Measurement of Product:

a-d) No Additional Requirements

1) Statistical Techniques: Provide for inspection of articles/characteristics per ASQR-20.1.
2) The use of an operator certification program or other special manufacturing methodologies (e.g. manufacturing controlling features, die/mold control, method of manufacturing, etc.) must be approved prior to implementation by the appropriate Member via ASQR-01 Form 3.
3) The supplier shall generally select M&TE with an accuracy ratio of 10 to1 (product tolerance to M&TE tolerance) however, accuracy ratios as low as 4 to 1 are acceptable, unless otherwise specified.

Use of M&TE with accuracy ratios less than 4 to 1 are not permitted unless a detailed measurement uncertainty analysis in accordance with ANSI/NCSL Z540.3 indicates an uncertainty ratio of 1.5 to 1, or better, and the measurement process is maintained under statistical quality control.

4) When functional performance / test data is required, include the following minimum requirements:

- Test specification number, revision status, amendment number and addendum.
- Part number / serial number and revision letter of material / component being tested.
- Test paragraph, required reading, actual reading (use positive statement, e.g., “No Leakage” if actual reading is not quantifiable).
- Date test was performed.
- Operator identification.
- Inspection approval signature / stamp.
- Blank entries that are not applicable shall be noted “N/A”.

8.3 Control of Nonconforming Product:

a) No Additional Requirements

b) Suppliers shall coordinate all reports of nonconformances for Member supplied material in accordance with the applicable Member requirements.

c) Articles deemed scrap must be clearly identified and rendered unusable within 30 days of final disposition unless otherwise instructed, in writing, by the applicable Member.

d) The cognizant Member must be informed immediately (not to exceed 24 hours or the next business day) of suspect nonconforming product shipped regardless of destination. Method of notification is determined per applicable Member requirements.

e) Ensure that related characteristics which may be affected by rework or repair operations are identified and reinspected after these operations are performed..

8.4 Analysis of Data: No Additional Requirements

8.5 Improvement:

8.5.1 Continual Improvement: No Additional Requirements

8.5.2 Corrective Action:

a-c) No Additional Requirements

d) When requested to provide corrective action, prepare a report documenting the occurrence, findings, and assessment of the affected product and submit to the applicable Member. Provide objective evidence of relentless root cause analysis and implementation of corrective action that eliminates risk of reoccurrence.

e) No Additional Requirements

f) To ensure effectiveness of the corrective action, suppliers shall perform

100% inspection of the deviated characteristics for a minimum of the next (3) three consecutive manufactured lots unless otherwise specified by the Member.

(g-i) No Additional Requirements

8.5.3 Preventive Action: No Additional Requirements

*** * * End of Document * * ***