
TITLE:**Flight Safety Parts Program**

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1. PURPOSE & SCOPE

This procedure defines unique requirements for the control of Flight Safety Parts. It supplements but does not replace other UTC Business Entity requirements.

Note: *Process Sheets / Supplier Documentation previously approved by UTC Business Entities need not be re-submitted, for new approval, until such time as the suppliers process / documentation is revised.*

2. APPLICATION

This procedure defines supplier quality requirements as agreed upon by the following business entities as UTC members of the ASQR Common Specification Team herein referred to as "UTC member".

Aftermarket Operations	AO
Hamilton Sundstrand	HS
Pratt & Whitney	PW
Pratt & Whitney Canada	PWC
Sikorsky Aircraft	SAC
UTC Fuel Cells	UTCFC

3. DEFINITIONS

- 3.1 **Flight Safety Parts (FSP):** For the purpose of this procedure the term Flight Safety Parts (FSP) is synonymous with P&W Prime Reliable Parts, PWC Critical Rotating Parts, PWC Engine Structural Integrity Parts (ENSIP), Hamilton Sundstrand Flight Safety Parts, UTCFC Human Space Flight Program and SAC Flight Safety Parts Program.

- 3.2 **Critical Characteristic (CC):** A Critical Characteristic (CC) is any dimension, tolerance, finish, material, installation, assembly, manufacturing or inspection process or other mechanical feature or electrical attribute of a FSP which, if nonconforming, could result in an unsafe condition.

For the purpose of this procedure the term critical characteristic is synonymous with Hamilton Sundstrand Flight Safety Characteristics (FSC) and SAC Flight Safety Critical Characteristic.

4. REQUIREMENTS

- 4.1 FSPs are identified on the drawing, drawing related documents or purchase order.
- 4.1.1 Critical Characteristics
- 4.1.1.1 A Black Five Pointed Star (★) on the drawing denotes a CC. For FSP (finish part configuration) drawings without black stars, all characteristics are considered critical.
- Note: Hamilton Sundstrand Flight Safety Part drawings without black stars have no FSCs.*
- Note: For Pratt & Whitney Flight Safety Parts (Prime Reliable Parts), Critical Characteristics shall be as defined by [ASQR-20.1](#).*
- 4.1.1.2 For supplier designed parts, the supplier and the applicable UTC Member Engineering organization shall jointly identify the FSP and CCs.
- 4.1.1.2.1 Suppliers shall:
- Identify CCs with a Black Star on the detail part and assembly drawings
 - Then submit these drawings to the applicable UTC Member Engineering organization for approval
- 4.1.1.2.2 The applicable UTC Member Engineering organization shall:
- Identify the FSP CC on their procurement control drawings
- 4.1.1.2.3 After CC identification, suppliers shall:
- Ensure that applicable CC data is incorporated into their maintenance instructions

4.2 Process Control

4.2.1 Suppliers and sub-tier suppliers that perform any process that affects a CC shall:

- Maintain a listing of sub-tier sources, to include special process sources, utilized in the manufacturing / processing / inspection of CCs which, provide traceability to the source
- Identify the facility location where work is performed
- Identify the manufacturing and inspection process operations, (i.e., feeds, speeds, equipment, tools and gages) to the extent required by the UTC Member
- Ensure only sources qualified / approved by the UTC member are used for special processes. Other processes that affect CCs will be subject to approval as required by the UTC Member.
- Denote on documents related to FSP processing “Flight Safety Part”, “Prime Reliable Part”, “Critical Rotating Part” as applicable. These documents shall include as a minimum:
 - Operation sheets
 - Purchase Orders
 - Inspection records, and
 - Shop travelers / Routers
- Obtain UTC Member initial approval for the process prior to initial delivery and all subsequent changes prior to delivery

4.2.2 Subcontractor / Sub-tier Flowdown Requirements

When subcontracting any operation that affects CCs, the supplier shall ensure that the purchase order to the sub-tier supplier identifies the part as a “Flight Safety Part”, “Prime Reliable Parts”, “Critical Rotating Parts”, “ENSIP Parts” or “UTCFC Human Space Flight Program” (as applicable), and invokes [ASQR-09.1](#).

4.3 Process Documentation

4.3.1 Operation sheets / inspection checklists or equivalent shall include the following:

- A statement at the beginning: “FLIGHT SAFETY PART”, “PRIME RELIABLE PART”, “CRITICAL ROTATING PART”, or “ENSIP PART”, “UTCFC HUMAN SPACE FLIGHT PROGRAM” (as applicable) “Contains Critical Characteristics, critical processes and cannot be revised or alternate material used, without prior written approval from the UTC Member.”
- Identification of all CCs or critical processes or inspections using a solid five pointed star (★), or other method approved by the UTC Member. If no specific characteristic is identified on the drawing, all operations are considered critical.
- Suppliers company name and location.
- Part number and revision letter.
- Provisions for recording CC inspection results including variable data for characteristics designated as critical per [ASQR-20.1](#).

For PW parts, the requirements for the recording of CC variable data shall be in accordance with the PW Addendum.

- Inspection method(s) and equipment used for CC inspections. Supplier’s subordinate work instruction that affect CCs by number and revision.
- Equipment used during manufacture of a FSP that affect CCs including but not limited to tools, gauges, and fixtures.
- Name and location of all sub-tier suppliers performing operations that affect CCs noted in the appropriate step of the operation sheet where their services are used.
- Reference(s) to drawing notes. When drawing notes are identified by a black star, the text of the note shall be included.
- Process documentation shall be written and maintained in English per [ASQR-01](#).

4.4 Initial Process Approval

4.4.1 Prior to approval the supplier shall be surveyed to the applicable UTC Member requirements.

4.4.2 The supplier and those sub-tier suppliers performing operations that affect CCs shall submit operation sheets and / or inspection checklists for approval to the appropriate UTC Member per purchase order requirements.

4.4.3 Approval may require on-site source/part/process verification for processes that affect CCs as determined by UTC Member.

4.5 Process Revisions

4.5.1 Changes, (to include changes to sequence of operation) made to an operation sheet and / or inspection checklist or related approved documentation shall be submitted to the UTC Member per purchase order requirements for review and approval prior to incorporation. Approval may require on-site evaluation as determined by the UTC Member.

4.5.2 When relocating a process, within a facility or to a different facility, prior notification of the relocation to the UTC Member is required. Approval may require on-site evaluation as determined by the UTC Member.

4.6 Process Approval Notification

Suppliers will be notified of process approval by the applicable UTC Member form.

4.7 Manufacture of Flight Safety Parts

Suppliers and sub-tier suppliers are to produce and inspect parts in accordance with approved process sheets including sequencing of all operations and steps within those operations. Suppliers shall under no circumstances deviate from the approved process.

4.8 Part Traceability

4.8.1 Parts shall be identified at the earliest possible opportunity in their manufacturing process to maintain traceability. Supplier and sub-tier supplier documents shall provide traceability throughout the manufacturing process.

4.8.2 When specified by the forging drawing or any other purchaser document, the supplier's traceability procedure and records shall permit each forging to be related to its forging lot, heat treat batch, as well as its location within the billet / bar, and the location of the billet / bar relative to the entire ingot / heat.

4.9 Inspection

4.9.1 Finished Parts or Assemblies: Inspection plans shall be in accordance with the requirements of [ASQR-20.1](#)

4.9.2 Raw Material: Sampling per [ASQR-20.1](#) may be applied to raw material characteristics of parts which require further processing (e.g. casting, forgings, and sonic shapes, etc.) unless characteristics are identified with a black star, wherein 100% inspection will apply.

4.9.3 Inspection Personnel: Supplier (primary) inspection personnel, accepting CCs shall be designated by the UTC Member.

4.9.4 First Article Inspection

4.9.4.1 Perform and document all First Article Inspection (FAI) in accordance with SAE AS9102 as required by [ASQR-01](#). Inspections of CCs shall be performed by an inspector designated by the UTC Member. A UTC Representative may perform an on-site validation of the FAI.

4.9.5 Product Releases Subsequent to FAI

4.9.5.1 Product acceptance and release subsequent to FAI shall be per purchase order or UTC Member Requirements.

4.9.5.2 The supplier of FSPs or services that affect CCs shall, for each shipment, document the revision letter / date of the approval process used.

4.10 Sub-tier Supplier Audits

4.10.1 Except for Nondestructive Inspection (NDI) / Nondestructive Testing (NDT), suppliers shall conduct annual "on-site" audits at all of their sub-tier sources involved in the manufacturing / processing of FSPs.

4.10.1.1 These audits shall be conducted and documented in accordance with the applicable UTC Member audit checklist, and shall be made available for review by UTC Members, upon request.

4.10.1.2 Audits are not required when the sub-tier source can provide documented evidence that a UTC Member FSP audit of their facility has been conducted within the past 12 calendar months.

4.10.2 Audit of NDI / NDT sources will be the responsibility of the UTC Member.

Note: *Hamilton Sundstrand will conduct all audits at sub-tier sources involved in the manufacture / processing of Hamilton Sundstrand Flight Safety Parts.*

4.11 Early Alert Reports

4.11.1 In the event a supplier should find that a significant issue (e.g., NDI indications, metallurgical or chemical non-conformance, parts manufactured to other than the approved process, etc.) has occurred, the supplier must notify the applicable UTC Member representative in writing within 24 hours as to the nature of the issue.

4.11.2 This report shall be generated for issues whether or not they affect CCs and shall provide sufficient detail to allow for any potentially affected hardware to be segregated, pending a comprehensive investigation. Ref: [ASQR-01](#).

5. RECORDS

5.1 Completed Quality records generated electronically or on paper shall be retained per the requirements of [ASQR-01](#).

5.2 Maintain records of CCs inspection results including recording of variable data where applicable.

For PW parts, the requirements for the recording of CC variable data including the maintaining of applicable records shall be in accordance with the PW Addendum.

5.3 When a supplier of these items is going out of business or no longer intends to manufacture the part, the supplier **must** notify all applicable UTC Members for instructions with respect to records.

6. REFERENCES

6.1	AS9102	Aerospace First Article Inspection Requirements
6.2	ASQR-01	Aerospace Supplier Quality Requirements
6.3	ASQR-20.1	Supplier Sampling Requirements
6.4	HS15000	Requirements for Flight Safety Parts – Hamilton Sundstrand
6.5	SS 9211	Flight Safety Parts Source Approval, Quality and Test Requirements

7. NATURE OF CHANGE

- PW Addendum Changes Only were made to include:
 - Para(s)s 1, 4.1, 5, 6, 7 and 8.1 added PW Specification Titles, Form Titles and/or Numbers to clarify
 - Para(s) 4.2 edited to clarify intent for SQAR Designation of feature / characteristics relate solely to that requirement
 - Para 6 edited wording “submit data reports/forms” to “maintain, retain, and make available for review upon request”
 - Para 7 edited to provide examples of sub-tier sources required for the PW Form 7985 and removed “Forging” source from the note.

Addendum – Pratt & Whitney

* 1. Application

Flight Safety Parts Program (FSP) ([ASQR-09.1](#)), applies when PW Quality Assurance Data Sheet (QAD) specifies Dimensional Control Standard for Prime Reliable Parts, DCS 178.

2. Definitions

Prime Reliable Parts (PRP) are defined as Disks, Rotors, Hubs, Integrated Bladed Rotors, Major Rotating Seals and Spacers which function or operate within a PW engine. Failure of these parts may cause substantial damage and could potentially result in an uncontained failure and possible loss of aircraft.

3. Process Sheet Approval

Process Sheets shall be approved as follows:

3.1 All changes must be approved by PW Quality Assurance (QA), prior to shipment.

3.2 Changes deemed to be “Process Changes” MUST be approved by PW Supplier Quality Assurance (SQA), Material Control Laboratory (MCL) and Materials & Process Engineering (M&PE) Representatives.

4. First Article Inspection (FAI)

Second “Independent” inspection requirements shall be controlled as follows:

* 4.1 Responsibility for performing the second independent inspection is determined utilizing PW Form 8006, 10% Random Selection Table, which is provided by the PW SQA Representative. Additional rules for form usage are as follows:

P = Requires PW SQA Representative witness or perform inspection

N = Supplier personnel shall conduct second inspection

* 4.2 Characteristics / features are required to be inspected for the second independent inspection, and shall be those designated “in writing” by the PW SQA Representative.

4.3 All FAI Reports must be approved / signed by PW, prior to the initial shipment of each FSP.

* Revised

* **5. Inspection Documentation**

Subsequent to FAI, suppliers need only to record the variable inspection data for features designated as critical per PWs Classification Of Characteristics Specification, PWA 397 (⊕) and features identified as Critical Life Characteristics (CLC) on an appendix to the Quality Data Sheet (QAD), Fracture Critical Part Characteristics, or <C> for Space Shuttle Main Engine (SSME).

* **6. Yield Data Reporting**

Suppliers shall maintain monthly yield data reports, utilizing Major Rotor Parts / Prime Reliable Parts Trend Data Form, MCL423.

Forms shall be retained by suppliers and available for review upon request.

* **7. Sub-Tier Source Lists**

Suppliers shall submit annually a PW Form 7985, listing sub-tier sources (e.g., forging, manufacturing, processing, etc.) utilized in the manufacture of PW PRPs.

NOTE: Mill sources are not required to be listed on PW Form 7985

8. Sub-Tier Annual Audits

* **8.1 Annual audits of sub-tier sources shall be performed utilizing PW Form 7990, PRP Subcontractor Audit Checklist.**

8.1.1 FSP / PRP audits of sub-tiers, utilizing PW Form 7990, need not be performed at mill sources, forging sources, sources who perform only rough machining / machining to sonic configuration of forgings, or Non-Destructive Testing (NDT).

8.1.2 Suppliers who utilize PW Module / Parts Centers as sub-tier sources need not conduct audits of PW facilities.

8.2 Suppliers need not conduct audits where evidence is available to show that PW has conducted a Quality Systems / FSP audit of the sub-tier source, within the past 12 calendar months.

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

* **Revised**