TITLE

UTC Production Part Approval Process (UPPAP)

1. PURPOSE AND SCOPE

This specification defines requirements for validating a manufacturing or assembly process which produces parts for a United Technologies Corporation (UTC) Member company.

The purpose of the specification is to ensure that all Member engineering and quality requirements are understood and fulfilled and that the manufacturing processes have been proven to consistently meet these requirements at the intended production rate by integrating upfront quality planning.

UPPAP will drive the identification and mitigation of risk early in the design and process development phases and ensure continuous design and process improvement. UPPAP will help ensure that Customer requirements are met, improve the Supplier's quality signature and lower the cost of poor quality.

Note: UPPAP is modeled after the Automotive Industry Action Group's (AIAG) Production Part Approval Process (PPAP) however differences exist given the distinctive requirements found in the aerospace industry.

2. APPLICATION

2.1 Supplier quality requirements defined in this document are agreed upon by and applicable to the following UTC aerospace business entities and their respective subsidiaries and controlled affiliates:

UTC Aerospace Systems	UTAS
Pratt & Whitney	P&W
Pratt & Whitney Canada	P&WC

Each such UTC aerospace business is herein referred to as a "Member".

2.2 UPPAP is required when invoked pursuant to a Purchase Order (PO) or any other contractual document issued by the Member.

UPPAP is not required on industry standard parts unless otherwise invoked by the Member.

Note: A Supplier with questions should contact their Member procurement representative who can refer them to the appropriate Member Focal Point (MFP).

2.3 Suppliers shall ensure that all members of their supply chain are compliant to this specification as defined in 5.1b.

3. REFERENCES

3.1 It is the responsibility of the Supplier to obtain current copies of non–UTC documents noted below at www.sae.org.

Document	Title
SAE AS9102	Aerospace First Article Inspection Requirements
SAE AS9103	Variation Management of Key Characteristics
SAE J1739	Potential Failure Mode and Effects Design (Design FMEA), Potential Failure Mode and Effects Analysis in Manufacturing and Assembly Processes (Process FMEA)

3.2 It is the responsibility of the Supplier to obtain current copies of UTC documents noted below. All are publicly available at www.utc.com under the Suppliers link, Aerospace Quality Requirements.

Document	Title
ASQR-01	Supplier Quality System Requirements
ASQR-09.1	Flight Safety Parts Program
ASQR-20.1	Supplier Sampling Requirements
UTCQR-09.1	Process Certification Requirements

3.3 For additional assistance with UPPAP, the Supplier should reference the IAQG Supply Chain Management Handbook at www.sae.org/iaqg, AS13003 - Measurement Systems Analysis Requirements for the Aero Engine Supply Chain and the following AIAG Manuals found at www.aiag.org: PPAP, FMEA, SPC, APQP & Control Plan and MSA.

3.4 Additional UPPAP reference documents such as the UPPAP Assessment Checklist, UPPAP Evidence Package / Workbook, Process Readiness Study Self-Assessment Workbook and Member Specific Reference Guide can be found online at www.utc.com in the UPPAP Toolbox – contact your MFP for more information.

4. DEFINITIONS

4.1 **Industry Standard Parts:** Items designated as AN (Air Force–Navy Aeronautical Standard), AS (Aerospace Standard), MS (Military Standard) and COTS (Commercial Off The Shelf).

4.2 **Cpk:** A common measure of process capability.

4.3 **Design Responsible Party (DRP):** A Supplier who has partial or full design responsibility of a component or design.

Note: Refer to the Member Specific Reference Guide for further detail on DRP.

4.4 **Engineering Frozen Planning/Engineering Source Approval (EFP/ESA):** Methodologies used by Members to designate and control approved sources or production processes to achieve consistent results by restricting or prohibiting changes to an approved process without acquiring appropriate Member approvals first.

4.5 **Feature:** Any characteristics, dimensions, notes, specifications, or embedded requirements found on the drawing or drawing related documents.

4.6 **Interclass Correlation Coefficient (ICC):** Compares several different scenarios and uses sums of squares to accomplish this task.

4.7 **Kappa:** Cohen's Kappa Statistic which is a measure for assessing the reliability of agreement between a fixed number of assessors.

4.8 **Key Characteristic (KC):** An attribute or feature whose variation has a significant influence on product fit, performance, service life, or producibility; that requires specific action for the purpose of controlling variation. KCs may be identified by the Member and/or the Supplier. This definition is further explained as follows:

- KCs for a part, subassembly, or system are those selected geometrical, material properties, functional and/or cosmetic features; which are measurable, whose variation control is necessary in meeting Customer requirements and enhancing Customer satisfaction.
- Process KCs are those selected measurable characteristics of a process whose control is essential to manage variation of part or system KCs (e.g. KPC-M).
- Substitute KCs may be identified when a Customer-defined KC is not readily measurable within the production/maintenance setting and other characteristics may need to be controlled to ensure conformance.
- Member KCs may be identified differently (KPC1, KPC2, KPC-D, CC, etc.).

Source: For further detail refer to AS9103.

4.9 **Member Focal Point (MFP):** Member designated UPPAP interface between the Supplier and Member responsible for supporting deployment and approving the UPPAP Package.

4.10 **Part Family:** A group of similar parts that have similar features, material, manufacturing process steps and are used for similar applications.

4.11 **Process Family:** A manufacturing process applied using similar machines, with similar tools and fixtures, with similar set-ups and programs and used to produce similar features.

4.12 **Process Review:** An onsite review of the Supplier process used to validate the UPPAP package by the MFP or their authorized delegates. (e.g. Controlled Build Review (CBR), Manufacturing Process Review (MPR), F Review).

4.13 **Source Qualification List (SQL)/Approved Special Process Listing (ASPL)**: A directory of approved sources for Special processes and NDT that meet specific Member criteria or requirements.

4.14 **Submission Level:** Defines the required documentation that shall be submitted to the MFP (or their authorized delegate) for review.

4.15 **Supplementary Product Requirement Documents (SPRD):** Any documents or files that are provided as part of the technical data package associated with a PO that, in addition to containing a drawing or model, help define the product or quality requirements. Refer to the Member Specific Reference Guide for Member equivalent and/or required documents.

4.16 **UPPAP File:** A collection of data and documents at the Supplier's location documenting compliance to UPPAP requirements for each part number. The file contains living documents, maintained and updated by the Supplier for the life of the part. This includes any supporting documentation for any level of its supply chain.

4.17 **UPPAP Package:** A submission by the Supplier containing evidence that the UPPAP Elements corresponding to the required submission level have been satisfied which is provided to the UTC Member for review and disposition. The package represents the UPPAP File at the point of submission.

4.18 Acronyms

ASPL	Approved Special Process Listing
BTP	Build To Print
CC	Critical Characteristic
COTS	Commercial Off The Shelf
DFMEA	Design Failure Mode and Effects Analysis
DRA	Design Risk Analysis
DRP	Design Responsible Party
EFP	Engineering Frozen Planning
ESA	Engineering Source Approval
FAIR	First Article Inspection Report
Gage R&R	Gage Repeatability & Reproducibility
ICC	Interclass Correlation Coefficient
IDS	Input Data Sheet
IPS	Initial Process Studies
KC	Key Characteristic
KPC	Key Product Characteristic
KPC-D	Key Product Characteristic - Design
KPC-M	Key Product Characteristic - Manufacturing
LRSD	Layout Report Summary Disposition
MFP	Member Focal Point
MSA	Measurement Systems Analysis
NDT	Nondestructive Test
P/T	Precision-to-Tolerance
PCP	Process Control Plan
PFD	Process Flow Diagram
PFMEA	Process Failure Mode and Effects Analysis
PO	Purchase Order
PRI	Process Robustness Index
PRS	Process Readiness Study
RFQ	Request For Quote
SPRD	Supplementary Product Requirement Document(s)
SPC	Statistical Process Control
SQL	Source Qualification List
TDP	Technical Data Package
TPM	Total Productive Maintenance
UPPAP	UTC Production Part Approval Process
UTC	United Technologies Corporation

5. REQUIREMENTS

5.1 UPPAP Process Overview

a. Upon notification of a UPPAP requirement and prior to the start of manufacturing, the Supplier shall create a plan to complete the UPPAP requirements (the "UPPAP Plan").

There are nineteen (19) UPPAP elements described in Section 5.3 hereof (individually, a "UPPAP Element" and collectively, the "UPPAP Elements"). The Supplier shall satisfy all UPPAP Elements unless a UPPAP Element is not applicable to the part or to the activities performed by the Supplier (e.g. UPPAP Element 11 would not be applicable if the part being produced does not have EFP/ESA requirements).

Any deviations from the requirements of ASQR-09.2, including UPPAP Elements that the Supplier proposes are not applicable, require approval by the MFP and shall be documented on ASQR-09.2 Form 1.

The UPPAP Plan shall be available upon request by the Member.

Note: The UPPAP Plan should show development of the UPPAP Elements (e.g. Process Flow Diagrams, DRA, PFMEA and Control Plans) as early as possible in the part design and manufacturing process development phases.

b. The Supplier shall flow down the requirements of UPPAP to all levels of its supply chain. Any Supplier risk-based process used to determine UPPAP applicability for sub-level components requires approval by the MFP and shall be documented on ASQR-09.2 Form 1. The Supplier's deployment to all levels of its supply chain shall include obtaining records of such deployment and ensuring all key detail part characteristics are properly included in the UPPAP File as objective evidence of UPPAP execution.

c. The Supplier shall create a UPPAP File documenting its development of the UPPAP Elements (e.g. Process Flow Diagrams, DRA, PFMEA and Control Plans) early in design and/or process development.

d. The Supplier shall collect supporting data to demonstrate that it has met the requirement of each UPPAP Element and include it in the UPPAP File as the data is produced. For all elements of UPPAP data collection, evaluations, analysis and assessments shall be completed with the tools, machines, instructions, methods, operators and processes used in delivering production parts. Data from non-production tooling or processes may only be used in the UPPAP File when approved by the MFP and documented on ASQR-09.2 Form 1.

e. The Supplier shall complete ASQR-09.2 Form 1 to reflect the status of the UPPAP File at the time of submission (the "UPPAP Package"). By signing this Form, the Supplier is certifying that the Form is current, complete and accurate.

f. All UPPAP Package submissions that do not receive “Full Approval” from the MFP shall contain a plan to achieve closure of any open item(s) including the commitment of actions, target dates and owners to achieve “Full Approval”.

g. The Supplier shall submit ASQR-09.2 Form 1 with the UPPAP Package to the MFP for formal disposition (reference paragraph 5.2.2). The Supplier shall include the ASQR-09.2 Form 1s from all applicable levels of its supply chain in the UPPAP package.

h. The Supplier shall obtain authorization via ASQR-09.2 Form 1 for Full or Interim Approval from the MFP before production parts are shipped. This does not negate or supersede other quality system requirements such as the FAIR.

i. Upon completion of open action items, the Supplier shall resubmit the UPPAP Package and obtain a formal “Full Approval” disposition from the MFP (reference paragraph 5.2.3).

j. The Supplier shall maintain the UPPAP File as living documents for the life of the part and continually review and update the UPPAP File to reflect the current process based on any change to the design or process. Where evidence of process instability occurs after UPPAP approval (SPC data, yield, non-conformances, escapes etc.), a review and analysis of applicable UPPAP Elements shall be completed as part of the root cause and corrective action activity to determine the impact on these elements. Updates shall be incorporated and implemented where appropriate. Reference paragraph 5.2.5 for requirements following any design or process changes.

5.2 UPPAP Submission and Disposition

5.2.1 Submission Levels

The default submission is Level 3 unless otherwise specified by the MFP.

Regardless of the Submission Level, the Supplier shall complete and maintain documentation for all applicable UPPAP Elements in its UPPAP file.

Submission Levels	Required Documentation
Level 1	ASQR-09.2 Form 1 only
Level 2	ASQR-09.2 Form 1 with limited supporting data
Level 3	ASQR-09.2 Form 1 with complete supporting data for all Elements per 5.2.3, submitted to Member
Level 4	ASQR-09.2 Form 1 with complete supporting data for all Elements per 5.2.3, reviewed by the Member at the Supplier’s manufacturing location (a detailed process review may be required as per 4.12)

5.2.2 Disposition

Before the first production part is shipped, the Supplier shall submit ASQR-09.2 Form 1 with the UPPAP Package and obtain either Interim or Full Approval as defined in paragraph 5.2.3.

The Supplier shall receive a signed copy of ASQR-09.2 Form 1 from the MFP with the following possible UPPAP dispositions:

- Full Approval
- Interim A Approval
- Interim B Approval
- Deferral
- Not Approved

Interim Approval indicates a gap between the UPPAP requirements and the Supplier's current status.

If the disposition is "Not Approved", the Supplier shall complete any MFP required actions and resubmit ASQR-09.2 Form 1 with the revised UPPAP package to obtain an Interim or Full Approval.

In very limited circumstances, an authorization for deferral may be requested via ASQR-09.2 Form 1 to authorize the shipment of production parts prior to achieving Interim or Full Approval.

Note: The Supplier should allow sufficient time, as defined by the MFP, to permit timely review and disposition.

5.2.3 Approval Levels

The table below describes the UPPAP approval levels by UPPAP Element. The UPPAP Elements shall be completed as indicated to achieve the specified approval level:

Element #	Element Name	Full Approval	Interim A Approval	Interim B Approval
1	Released Production Drawings or Definition	X	X	X
2	Supplementary Product Requirement Documents	X	X	X
3	Production Purchase Order	X	X	X
4	Design Risk Analysis	X	X	X*
5	Process Flow Diagram	X	X	X
6	PFMEA	X	X	X*
7	Process Control Plan	X	X	X
8	Process Readiness Study	X	X	X*
9	Initial Process Studies	X	Cpk >1.0	Insufficient data
10	Measurement Systems Analysis	X	X	P/T ratio > 20%*
11	Engineering Frozen Planning/Engineering Source Approval	X	X	X
12	Dimensional Reports	5 dimensional reports w/ zero non-conformances	At least 2 dimensional reports completed	At least 1 dimensional report completed
13	Functional Testing Approval	X	X	X
14	Special Process & NDT Approval	X	X	X
15	Material Certification Documentation	X	X	X
16	Member Defined Raw Material Approval	X	X	X
17	Part Marking Approval	X	X	X
18	Packaging, Preservation and Labeling Approval	X	X	X
19	Review and Sign-Off	X	X	X

X - Full Compliance to element requirement, no open actions exist.
** - Submitted but open actions or mitigation plans exist and are approved by the MFP.*

Any exceptions to the above table require MFP authorization via the ASQR-09.2 Form 1 deferral section to allow shipment.

Note: UPPAP Elements will be evaluated using the UPPAP Assessment Checklist.

5.2.4 UPPAP Documentation

The UPPAP File maintained by the Supplier shall:

a. Be part number specific (reference paragraph 5.3 for elements that may be satisfied using a part or process family methodology).

b. Be maintained by the Supplier at the manufacturing location.

c. Be maintained with all applicable items up-to-date and represent the current production process regardless of whether a Member requests a formal submission.

d. Contain copies of all approvals by the MFP.

e. Be retained for the period required by ASQR-01 or other Member specific retention requirements.

As per ASQR-01, the Member reserves the right to audit the UPPAP File of the Supplier and any of its supply chain.

5.2.5 UPPAP Change

Following the initial UPPAP Approval (Interim or Full), the Supplier shall resubmit an updated ASQR-09.2 Form 1 with the accompanying UPPAP Package if any of the following changes are planned or have occurred:

a. A change in design characteristics affecting fit, form, or function of the part.

b. A change in manufacturing source(s), process(s), inspection method(s), locations of manufacture, tooling or materials that can potentially affect fit, form or function.

c. A change in numerical control program or translation to another media that can potentially affect fit, form or function.

d. A natural or man-made event, which may adversely affect a manufacturing process.

e. A lapse in production for two years shall require an update for any UPPAP Elements that may be impacted by the inactivity or as specified by the Customer.

MFP disposition of ASQR-09.2 Form 1 shall be obtained prior to shipping production parts after the implementation of any such changes.

Source: For additional detail refer to AS9102.

Note 1: This requirement is in addition to all other obligations to the Member (AS9102, NDT, EFP/ESA, etc.).

Note 2: Reference ASQR-01 for change management notification requirements.

5.3 UPPAP Elements

(1) Released Production Drawings or Definition ^

(2) Supplementary Product Requirement Documents ^

(3) Production Purchase Order

(4) Design Risk Analysis *

(5) Process Flow Diagram *

(6) Process Failure Mode and Effects Analysis *

(7) Process Control Plan *

(8) Process Readiness Study *

(9) Initial Process Studies

(10) Measurement Systems Analysis *

(11) Engineering Frozen Planning/Engineering Source Approval ^

(12) Dimensional Reports

(13) Functional Testing Approval

(14) Special Process and NDT Approval ^

(15) Material Certification Documentation ^

(16) Member Defined Raw Material Approval

(17) Part Marking Approval

(18) Packaging, Preservation and Labeling Approval *

(19) Review and Sign-Off

^ Element may be satisfied using an approved First Article Inspection Report (FAIR) per AS9102 with approval of the MFP.

* Element may be satisfied using a part or process family methodology but all unique characteristics shall be evaluated and accounted for by part number.

Note 1: The numbering sequence of UPPAP Elements does not reflect the order of execution.

Note 2: Any feature identified on the IDS (ASQR-09.2 Form 3) and all product and process KCs need to be reflected in the following UPPAP Elements (5, 6, 7, 9 and 10).

5.3.1 Element 1 - Released Production Drawings or Definition

The Supplier shall ensure the product has been manufactured to a production released design definition and the drawing revision aligns with the PO requirement.

The Supplier shall include a copy of the verified product drawings in the UPPAP File. Where digital product definition is applicable, the revision of the model shall be verified and documented in the UPPAP File.

DRP Suppliers shall include a copy of their current drawing, bill of material and the Member's associated drawing in the UPPAP File.

Applicable internal and external specifications shall be readily available.

Note: Refer to the Member Specific Reference Guide for further detail on Member associated drawings.

5.3.2 Element 2 - Supplementary Product Requirement Documents (SPRD)

The Supplier shall ensure that the product has been manufactured to production released SPRD and that the document revision aligns with the PO and product definition requirement. The Supplier shall include a copy of the verified SPRD in the UPPAP File.

Note: Refer to the Member Specific Reference Guide for further detail on SPRD.

5.3.3 Element 3 - Production Purchase Order

The Supplier shall ensure that the product has been manufactured to a production PO or other contractual document and all product definition revisions align with those referenced on the PO or contract. The Supplier shall include a copy of the production PO or contract in the UPPAP File, along with the anticipated peak production rate as communicated by the Member.

5.3.4 Element 4 - Design Risk Analysis (DRA)

DRPs shall ensure that a Design Risk Analysis methodology related to performance, durability, reliability, assembly and manufacturability is executed and appropriate mitigation activities are identified, prioritized and completed. A Design Failure Modes and Effect Analysis (DFMEA) per SAE J1739 or other DRA that achieves the same objectives shall be used. The Supplier shall include evidence of the risk analysis in the UPPAP File.

Product KCs defined by design to control identified risks and any additional features shall be communicated to the Supplier via the product definition using ASQR-09.2 Form 3, or Member equivalent means. Any product related risks that may be affected by the manufacturing process and cannot be eliminated through the design shall be communicated to the Supplier as product KCs via the product definition using ASQR-09.2 Form 3, or equivalent means. Any Build-to-Print (BTP) Supplier shall include the latest copy of ASQR-09.2 Form 3 in the UPPAP File.

Note 1: DRAs may be derived from part family DRAs as long as any unique product characteristics have been reviewed and included.

Note 2: DRPs may use the ASQR-09.2 Form 3 to communicate product and process KCs defined to control identified risks to all levels of its supply chain.

5.3.5 Element 5 - Process Flow Diagram

The Supplier shall create a Process Flow Diagram or equivalent to facilitate the development of a robust PFMEA and Control Plan. The Supplier shall include a copy of the Process Flow Diagram in the UPPAP File. The Process Flow Diagram shall include:

- Production process steps and sequences from receiving material to shipment of end product
- Standardized flowchart symbols
- Alternate process paths and formal rework loops
- Outside operations
- Transportation and handling
- Key inputs and outputs of each process step
- Identification of steps that impact product or process KCs including any additional features identified in the DRA or on the IDS and Supplier identified process KCs (e.g. KPC-M)

Note 1: Process Flow Diagrams may be derived from part family diagrams as long as any unique processing steps and characteristics have been reviewed and included.

Note 2: The Supplier should consider the maximum expected volume as communicated by the Member to define the process flow.

5.3.6 Element 6 - Process Failure Mode and Effects Analysis (PFMEA)

The Supplier shall ensure risks associated with the manufacturing or assembly process have been identified and mitigated using a PFMEA per SAE J1739 (or an equivalent process that achieves the same objectives).

The Supplier shall develop, document and maintain the part or assembly PFMEA and ensure consideration of the following:

- Process Flow Diagram alignment
- Product features, tolerances, KCs etc.
- Features identified in the DRA or on the IDS
- Supplier identified process KCs (e.g. KPC-M)
- Product family quality history, including but not limited to non-conformances, escapes and lessons learned.

The Supplier shall include a copy of the PFMEA in the UPPAP File.

Note: PFMEA's may be derived from part family PFMEA's as long as any unique product characteristics and/or processing steps have been included.

5.3.7 Element 7 - Process Control Plan

The Supplier shall ensure any manufacturing risks are adequately controlled by developing a Process Control Plan (refer to UTCQR-09.1). The Process Control Plan shall be used to ensure sustained process control throughout the manufacturing life of the part and/or assembly. The Process Control Plan shall identify the product and process KCs, Key Process Inputs (KPIs) and associated controls. The Process Control Plan shall include:

- Operation/process step where any product or process KC is measured
- Specification/tolerance for all product and process KCs
- Measurement system used
- Sample size and frequency
- Control method (type of control chart, set-up inspections, etc.)
- Reaction Plans

The Supplier shall include a copy of the Control Plan in the UPPAP File.

Note: Control Plans may be derived from part family Control Plans as long as any unique product characteristics and/or processing steps have been included.

5.3.8 Element 8 - Process Readiness Study (PRS)

The Supplier shall ensure its manufacturing process will meet the production requirements at projected full demand rate by completing a Process Readiness Study representing all levels of its supply chain that includes:

- Manufacturing process steady state - tools, fixtures, manufacturing equipment and gages
- Operation work instructions
- Process control methods
- Gage suitability (discrimination, applicability etc.)
- Total Productive Maintenance (TPM) program
- Supply Chain management
- Prevention, detection and removal of foreign objects

The Supplier shall include a copy of the PRS in the UPPAP File.

For any additional Member specific requirements, refer to Appendix A. Where no Member specific requirement is invoked in Appendix A, the "UTC Process Readiness Study self-assessment tool" or equivalent may be used.

Note 1: A PRS may be performed with a Member representative or as a self-evaluation based on Member guidelines.

Note 2: PRS's may be derived from part family PRS's as long as any unique

product characteristics and/or processing steps have been included.

5.3.9 Element 9 - Initial Process Studies (IPS)

The Supplier shall conduct an initial capability study of the manufacturing processes used to produce all product and process KCs. The UPPAP File shall contain documented evidence that initial process studies have been conducted for all product and process KCs including any substitute KCs and additional features identified on the ASQR-09.2 Form 3 and Supplier identified process KCs (e.g. KPC-Ms). Any exception to this requirement shall be approved by the MFP and documented on ASQR-09.2 Form 1.

Data shall be captured from a minimum of 25 consecutive parts representing process variation approved by the MFP and documented via ASQR-09.2 Form 1. Any out-of-tolerance or out-of-control conditions shall be addressed by the Supplier.

Note 1: Provided the same tooling, equipment and processes intended for production are used, data collected from development or pre-production parts can be considered.

Note 2: Process variation includes variability associated with piece to piece, setup to setup, machine to machine, time to time and lot to lot.

Acceptance Criteria:

The Supplier shall use the following as acceptance criteria for evaluating initial Process Study results.

Results	Interpretation
Cpk ≥ 1.33	The process currently meets requirements.
Cpk < 1.33	The process does not currently meet the acceptance criteria. Contact the MFP to review the process study results and propose necessary process and control plan improvements.

Process capability indices shall only be calculated after the process is determined to be stable, in statistical control and the requirements of Element 10 (MSA) have been met.

The capability indices shall be calculated using the appropriate distribution that the process represents (normal, exponential, Weibull, etc.). Measures of process capability other than Cpk may be used only if such measures have received documented approval by the MFP.

Variable data shall be used wherever feasible. If using attribute data, refer to UTCQR-09.1 to establish the capability index.

Note 3: With MFP agreement of the approach and source of data, use of short run SPC techniques (e.g. target, group, part family charts) may be allowed to meet the 25 part minimum requirement (where full production run is less than 25 parts or 25 parts will take an unreasonable amount of time).

Note 4: Execution of this UPPAP Element does not automatically grant any

sampling authorization. For UTC Supplier sampling requirements, refer to ASQR-20.1.

If a conflict arises between ASQR-09.2 and Member defined specifications or procedures for raw material dimensional qualification and process monitoring requirements, the latter shall take precedence.

For any additional Member specific requirements, refer to Appendix A.

5.3.10 Element 10 - Measurement Systems Analysis (MSA)

The Supplier shall ensure adequacy and applicability of the measuring systems to evaluate and monitor product and process KCs, any additional features identified on the ASQR-09.2 Form 3 and Supplier identified process KCs (e.g. KPC-M).

The UPPAP File shall contain copies of the Measurement Systems Analysis (including Gage R&R) conducted on all instruments used for measuring all product and process KCs. For custom designed gaging, evidence of inspection and acceptance testing (gage inspection, try-out reports, etc.) shall also be included in the UPPAP File. Any Gage R&R studies shall have a Precision-to-Tolerance (P/T) ratio ≤ 20% unless a lower maximum ratio is required by the Member.

When P/T ratio is not achieved, or when other deficiencies are identified such as bias, stability, linearity, repeatability, or discrimination, the Supplier shall provide a mitigation plan which ensures conformity of product. MFP acceptance of any mitigation plan is required.

Where attributes are used to assess feature acceptability (e.g. pass/fail criteria) the evaluation of measured variable data is not possible. The following criteria shall be used to determine acceptance of the measurement system: Pass/Fail: Kappa >= 0.8. Ordinal: ICC >= 0.75.

Note: MSA's may be derived from part family MSA's as long as any unique product characteristics and/or processing steps have been included.

5.3.11 Element 11 - Engineering Frozen Planning/Engineering Source Approval

The Supplier shall validate that all Engineering Frozen Planning (EFP) or Engineering Source Approval (ESA) requirements are met when invoked by a Member specification. The Supplier shall include in the UPPAP File appropriate evidence showing conformance to the EFP/ESA requirements.

For any additional Member specific requirements, refer to Appendix A.

Note: Refer to the Member Specific Reference Guide for further detail on Member EFP/ESAs.

5.3.12 Element 12 - Dimensional Reports

The Supplier shall create a minimum of 5 dimensional reports listing variable results for all drawing features with tolerances from strategically selected parts (AS9102 Form 3 or equivalent form may be used). Strategically selected parts shall be sampled over a sufficient time to capture variability associated with piece to piece, setup to setup, machine to machine, time to time and lot to lot variation considering all unique process streams. Any out-of-tolerance, out-of-control or trending towards out-of-tolerance conditions shall be addressed by the Supplier.

The UPPAP File shall contain a copy of the approved First-Article Inspection Report (FAIR) prior to shipping production parts. The Supplier shall submit AS9102 Form 3 from this FAIR in the UPPAP package as the first dimensional report requirement for Interim or Full Approval.

If a conflict arises between ASQR-09.2 and Member defined specifications or procedures for raw material dimensional qualification and process monitoring requirements, the latter shall take precedence.

For any additional Member specific requirements, refer to Appendix A.

Note 1: In-process gaging or automated inspection may be used to capture this data.

Note 2: Execution of this element does not automatically grant any sampling authorization. For UTC Supplier sampling requirements, refer to ASQR-20.1.

Note 3: The four (4) additional dimensional reports are not required to be FAIR's.

5.3.13 Element 13 - Functional Testing Approval

When required by Member specification, the Supplier shall validate that all functional tests have been approved and requirements have been met. Test results for quantities required in the referenced specification shall be retained in the UPPAP File. The MFP may request additional functional test sampling.

Note: Refer to the Member Specific Reference Guide for further detail on Member Functional Testing Approval.

5.3.14 Element 14 - Special Process and NDT Approval

The Supplier shall validate that all Special Process and NDT Approval requirements are met. The Supplier shall include in the UPPAP File:

If a Special Process or NDT is required on:	Then …
A Member drawing (including drawing related documents)	Only Member approved Special Process and/or NDT Suppliers shall be used. An excerpt of the Member company's SQL/ASPL referencing the special process Supplier name and vendor code (with date processed), is sufficient evidence. Additional evidence may be required by the Member based on specification requirements (approved technique sheet, etc.).
A DRP drawing / definition	A copy/excerpt of the Supplier's source qualification for special processes and/or NDT, referencing the special process and/or NDT Supplier name, is sufficient evidence.

Note 1: Refer to the Member Specific Reference Guide for further detail on Member Special Processes & NDT Approval.

Note 2: Reflect special processes requiring lab qualification and NDT approvals on the Certificate of Conformity (CofC).

5.3.15 Element 15 - Material Certification Documentation

The Supplier shall validate that all Material Certification requirements are met.

The Supplier shall include in the UPPAP File:

- For BTP parts, documented evidence that the material used was purchased from a Member approved source when required.
- For DRP parts, provide evidence that the Supplier utilizes approved sources for material and a copy of the Certificate of Conformity (CoC). If material is from a non-approved source, provide copies of the material test reports and results obtained through an approved Member test facility when required.

Contact the MFP if the above conditions are not met.

5.3.16 Element 16 – Member Defined Raw Material Approval

For Member defined raw material such as castings, forgings, or other raw material, the Supplier shall verify that all specified dimensional requirements are met.

The Member approved dimensional report shall be retained in the UPPAP File and the Supplier shall include a copy of the approval of this report in the UPPAP package.

5.3.17 Element 17- Part Marking Approval

The Supplier shall ensure all Member part marking requirements are met by obtaining part marking approval from the Member. The Supplier shall include evidence of Member approval and a photograph of the approved part marking in the UPPAP File.

5.3.18 Element 18 - Packaging, Preservation and Labeling Approval

The Supplier shall verify that the production intended packaging meets the Member defined specifications by obtaining packaging approval from the Member. The Supplier shall include evidence of Member approval in the UPPAP file.

Note 1: Refer to the Member Specific Reference Guide for further detail on Member Packaging, Preservation and Labeling Approval.

Note 2: Packaging, Preservation and Labeling may be derived from part family Packaging, Preservation and Labeling as long as any unique product characteristics and/or processing steps have been included.

5.3.19 Element 19 - Review and Sign-Off

The Supplier shall:

- Verify all measurement and test results show conformance with Member requirements
- Ensure all required documentation is available and maintained within the UPPAP File
- Review all applicable data for content and accuracy before submitting the UPPAP Package for approval
- Upon a satisfactory internal review, complete ASQR-09.2 Form 1 and submit to the MFP for approval along with the necessary UPPAP Package based on the Submission Level
- Complete a separate ASQR-09.2 Form 1 for each part number unless otherwise approved by the MFP
- Approve the submission of UPPAP Packages and any deviations to the requirements of this procedure for all levels of its supply chain
- Include the ASQR-09.2 Form 1s from all levels of its supply chain (as defined in 5.1b) in the UPPAP Package

6. RECORDS & FORMS

Completed quality records, generated electronically or on paper, shall be retained per the requirements of ASQR-01. The following records are referenced within this document:

Record	Title
ASQR-09.2 Form 1	UPPAP Approval Form
ASQR-09.2 Form 3	Input Data Sheet (IDS)
ASQR-01 Form 2	UPPAP Change Notification
AS9102 Form 3	Characteristic Accountability, Verification and Compatibility Evaluation

7. NATURE OF CHANGE

25-May-2016

Editorial Changes as follows:

- 4.13 - Changed text - special ~~materials and~~ processes and NDT. (ASQR-01 alignment)
- 5.2.3 – Element 10 Interim B changed to ‘X’. (clarification of text)
- 5.2.5 – Change text - Note 2 Reference ASQR-01 for change management notification requirements. (ASQR-01 alignment)
- 5.3.6 – Remove text - For any additional Member specific requirements, refer to Appendix A. (No longer in Appendix A)

18-Jan-2016

This procedure has been entirely revised. Among the more significant changes:

- Interim Approvals redefined
- The ASQR-09.2 Form 2 has changed to ASQR-01 Form 2
- Appendix A added to define additional Member requirements
- Member Specific Reference Guide added to the UPPAP toolbox

APPENDIX A – Member Specific Requirements

Pratt & Whitney (P&W)

No additional requirements.

Pratt & Whitney Canada (P&WC)

5.3.8 **PRS:** P&WC Form 10285 Process Robustness Index (PRI) shall be used for all parts except raw material in which case P&WC Form 10395 shall be used.

UTC Aerospace Systems (UTAS)

5.3.19 **Review and Sign-Off:** The Supplier shall submit a completed UTAS-FRM-1004 along with the UPPAP Package.

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