APQP & PPAP within the Aerospace Supply Chain.

Hosted by the AESQ Subject Matter Interest Group
Webinar Overview

We are recording today’s webinar and will distribute the video link following the close of the webinar. It will also be posted on the AESQ website for free viewing.

We will take questions during today’s webinar using the Chat feature.

Please remain on Mute during the presentation to prevent background noise. We will also be muting all lines at the start of the session.
## Webinar Overview

<table>
<thead>
<tr>
<th>Section</th>
<th>Timing</th>
<th>Lead</th>
</tr>
</thead>
<tbody>
<tr>
<td>Introduction</td>
<td>5 mins</td>
<td>Russell Palmiter [Pratt &amp; Witney]</td>
</tr>
<tr>
<td>AS13100 APQP &amp; PPAP v AS9145</td>
<td>15 mins</td>
<td>Kenneth Hatcher [Raytheon Technologies]</td>
</tr>
<tr>
<td>When does APQP and PPAP apply?</td>
<td>10 mins</td>
<td>Daniel McCarty [PCC Structural]</td>
</tr>
<tr>
<td>PPAP File and Submission</td>
<td>20 mins</td>
<td>Michael Fuehner [GE Aviation]</td>
</tr>
<tr>
<td>Demystifying use of APQP and the link with PPAP</td>
<td>45 mins</td>
<td>Karl Evans [Rolls-Royce]</td>
</tr>
<tr>
<td>Demystifying ongoing change management</td>
<td>15 mins</td>
<td>Robert Latour/ Russell Palmiter [Pratt &amp; Witney]</td>
</tr>
<tr>
<td>Close – Q&amp;A</td>
<td>10 mins</td>
<td>Magnus Holm / Ake Winkvist [GKN]</td>
</tr>
</tbody>
</table>
How to Contribute

Use the Chat Function to ask a question at any time, or to make a comment.

Magnus Holm
Supplier Quality Systems Lead
GKN Aerospace

Åke Winkvist
Manufacturing Engineer - Industrial
GKN Aerospace
Polling

Becky Lemon
Industry Program Manager
SAE ITC

Please answer the Survey Questions when asked (they are anonymous).

a) Have you read AS13100?
   I. Yes
   II. No

(b) Are you using RM13145 as a guide for APQP and PPAP?
   I. Yes
   II. No

(c) How would you judge your knowledge of APQP?
   I. No Knowledge
   II. I know of it but no experience of using it
   III. I have used it a few times
   IV. I consider myself to be an expert

(d) How would you judge your knowledge of PPAP?
   I. No Knowledge
   II. I know of it but no experience of using it
   III. I have used it a few times
   IV. I consider myself to be an expert
AS13100 SECTIONS AND APQP/PPAP V AS9145

KENNETH HATCHER
RAYTHEON TECHNOLOGIES

RTX Quality Transformation Lead and SAP S4HANA transition Quality Lead. Served 20 plus years in the Quality Assurance Community. Roles included Hardware, Software, and Supplier Quality
Introduction

• This portion of the presentation covers the harmonization efforts and tailoring requirements in AS13100 relative to ISO9000, 9100, 9145

• The purpose of this presentation is only to do a high-level review of these harmonization efforts and highlight the differences between AS9145 & AS13100 Chapter B

• NOTE: APQP-PPAP is a requirement in AS13100, not a requirement in AS9100
AS13100 Foundation

- Aerospace Engine Supplier Quality (AESQ) wanted to simplify the Quality Management System (QMS) requirements to the Aero Engine Manufacturers and Supply Base

- AS13100 was created to harmonize ISO 9001, 9100, and 9145 and customer specific requirements for aero engine manufacturing
AS9145 and AS13100 Comparison

AS9145 defines the aviation, space, and defense APQP and PPAP requirements

AS13100 complements AS9145 APQP and PPAP with tailored requirements and practices for the AESQ supply chain

AS13100 Chapter B and supporting Reference Manuals provide the details to these tailored requirements
How does AS13100 APQP & PPAP complement AS9145

- Introduced Process Flow (customer & supplier).
- Improved clarity of AS9145 content.
- Linked RM1300X’s as appropriate.
- Improved APQP Management – Enabled activities to be configurable and saleable based on change situations. Use of Events, planning deliverables and Elements to simply expectation during change management.
- Improved PPAP Management – Use of Submission Levels, clarification of Quality & Rate Data collection and enabled great customer standardisation.
- Providing robust methods & practices to operate APQP and PPAP through RM13145 (APQP & PPAP).
WHEN DOES APQP AND PPAP APPLY

DANIEL MCCARTY
PCC STRUCTURALS

Head of Quality for Precision Castparts Corporation Fasteners and Engineered Products Divisions. AESQ committee deputy voting member representing PCC Structural, Inc since 2019.
**Applicability of APQP and PPAP**

After Jan1, 2023

AS13100 § 13.3 Scope (APQP)

AS13100 § 18 AESQ SC Risk Management Process

AS9145 § 4.1 General Requirements

---

**Reference RM13145 § 5.1**

1. New Product Design,
2. Product Design Modification,
3. Transfer from one facility to another (no product mod.),
4. New Process (no Product mod or new product design),
5. Processing changes (no Product mod),
6. Specific to Process Tooling replace/refurb
**Scope of APQP and PPAP**

*So you have a …*
New Product Designs  
New or Changes to Manufacturing Methods  
Manufacturing Transfers

*Where do I go…*
RM13145 Table 10 (pg 35)  
Customer quality representative

---

**Table 10: Application Matrix for APQP and PPAP Elements**

<table>
<thead>
<tr>
<th>Change Situations (as guidance, move left to right until relevant)</th>
<th>GREEN refers to Non-Product Changes</th>
</tr>
</thead>
<tbody>
<tr>
<td>APQP and PPAP Elements</td>
<td>New Product Design</td>
</tr>
<tr>
<td>DESIGN RECORD and BOM</td>
<td>X</td>
</tr>
<tr>
<td>DESIGN RISK ANALYSIS (DFMEA)</td>
<td>X</td>
</tr>
<tr>
<td>DESIGN FOR MANUFACTURE</td>
<td>X</td>
</tr>
<tr>
<td>PRODUCT CI and KC</td>
<td>X</td>
</tr>
<tr>
<td>PACKAGING SPECIFICATION</td>
<td>X</td>
</tr>
<tr>
<td>DESIGN VERIFICATION/VALIDATION RESULTS</td>
<td>X</td>
</tr>
<tr>
<td>PROCESS FLOW DIAGRAM</td>
<td>X</td>
</tr>
<tr>
<td>FLOOR PLAN LAYOUT</td>
<td>X</td>
</tr>
<tr>
<td>PACKAGING, LABELLING, ETC</td>
<td>X</td>
</tr>
<tr>
<td>TEST INSPECTION PLAN (Char, Matrix)</td>
<td>X</td>
</tr>
<tr>
<td>FMEA</td>
<td>X</td>
</tr>
<tr>
<td>PROCESS KEY CHARACTERISTICS</td>
<td>X</td>
</tr>
<tr>
<td>CONTROL PLAN (Pre-Launch / Production)</td>
<td>X</td>
</tr>
<tr>
<td>PRELIMINARY TACT TIME LEAD TIME</td>
<td>X</td>
</tr>
<tr>
<td>WORK STATION DOCUMENTATION</td>
<td>X</td>
</tr>
<tr>
<td>MSA PLAN</td>
<td>X</td>
</tr>
<tr>
<td>PRODUCTION PROCESS RUN@D</td>
<td>X</td>
</tr>
<tr>
<td>MSX STUDIES</td>
<td>X</td>
</tr>
<tr>
<td>INITIAL PROCESS CAPABILITY STUDIES</td>
<td>X</td>
</tr>
<tr>
<td>DIMENSIONAL AND NON-DIMENSIONAL RESULTS</td>
<td>X</td>
</tr>
<tr>
<td>PRODUCT VALIDATION RESULTS</td>
<td>X</td>
</tr>
<tr>
<td>INITIAL MANUFACTURING PERFORMANCE STUDIES</td>
<td>X</td>
</tr>
<tr>
<td>CUSTOMER SPECIFIC REQUIREMENTS (PPAP)</td>
<td>X</td>
</tr>
<tr>
<td>FIRST ARTICLE INSPECTION</td>
<td>X</td>
</tr>
<tr>
<td>PPAP SUBMISSION (incl. Approval Form)</td>
<td>X</td>
</tr>
</tbody>
</table>

*Key:*
- X: Mandatory if Customer and/or Supplier to ASI310/0 require this, otherwise recommended. Either:
  - Create new.
  - Update the existing.
  - Develop new and aligned to what has changed.
- [X]: as above X and consider these Notes:
  - MSA: not apply to product-specific requirements related to the Design Record and associated specification (E.g.: KCV)
  - PPAP: for design responsible organizations only
  - X (NOTE): as above X and consider these Notes:
  - When specified by the related MSA Plan (Phase 5 of APQP)
  - When specified by the related MSA Plan (Phase 3 of APQP)
  - When specified by the related MSA Plan (Phase 4 of APQP)
  - When specified by the related MSA Plan (Phase 6 of APQP)
PPAP FILE AND SUBMISSION

Along with my role in Supplier Quality, I have worked on several project teams implementing APQP within GE Aviation’s Quality Management System. The scope of these teams has focused on integrating APQP within the Source Change process, as well as the phases of New Product Introduction. I also work on a team whose goal is to communicate and clarify the resources and requirements of APQP to both the Supply Base and within GE Aviation. I have held previous roles in Quality and Production at the manufacturing level, where part of my responsibility was to execute and support APQP efforts, including PPAP.
Definitions

**PPAP File** – A living file containing objective evidence in support of PPAP requirements.

**PPAP Submission** – The package provided to the customer for approval, containing elements of the PPAP File as defined by the Submission Level.

**PPAP Approval Form** – A form included with all PPAP Submissions verifying the PPAP content and status.

**Pre-Launch Control Plan** – Plan that includes additional process controls to those intended for ongoing production (e.g., items from Design of Experiment studies). Reference RM13004.
**PPAP File**

- Includes all elements, regardless of submission level.
- Real-time information
- Many formats
- Source of data for PPAP Submission

<table>
<thead>
<tr>
<th>Ref</th>
<th>Element title</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Design Record</td>
</tr>
<tr>
<td>2</td>
<td>Design Failure Mode and Effects Analysis (DFMEA)</td>
</tr>
<tr>
<td>3</td>
<td>Process flow diagram</td>
</tr>
<tr>
<td>4</td>
<td>Process Failure Mode and Effects Analysis (PFMEA)</td>
</tr>
<tr>
<td>5</td>
<td>Control plan</td>
</tr>
<tr>
<td>6</td>
<td>Measurement System Analysis Studies</td>
</tr>
<tr>
<td>7</td>
<td>Initial process capability studies</td>
</tr>
<tr>
<td>8</td>
<td>Packaging, labelling standard and documentation</td>
</tr>
<tr>
<td>9</td>
<td>First Article Inspection</td>
</tr>
<tr>
<td>10</td>
<td>Customer-specific requirements</td>
</tr>
<tr>
<td>10.1</td>
<td>Dimensional/Non-Dimension results</td>
</tr>
<tr>
<td>10.2</td>
<td>Initial manufacturing performance studies</td>
</tr>
<tr>
<td>11</td>
<td>PPAP Approval Form (or equivalent)</td>
</tr>
</tbody>
</table>
PPAP Submission - Evidence

Submission is defined by the customer.

Five levels – See Table 11, AS13100
Default is Level 3

Submission levels vary based on what is retained vs. submitted to the customer.

Some elements allow for on-site witnessing by customer.
## PPAP Submission

[S] – Submit to Customer

[R] – Retain at supplier, available upon request

[W] – Witness, on-site

[C] – [S] and/or [W]

### Table 11 - Submission/retention levels

<table>
<thead>
<tr>
<th>PPAP ELEMENT NUMBER</th>
<th>AESQ PPAP ELEMENT</th>
<th>SUBMISSION LEVEL</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>SL1</td>
</tr>
<tr>
<td>1</td>
<td>Design Record</td>
<td>S R</td>
</tr>
<tr>
<td>3</td>
<td>Process flow diagram</td>
<td>R</td>
</tr>
<tr>
<td>4</td>
<td>Process FMEA</td>
<td>R</td>
</tr>
<tr>
<td>5</td>
<td>Control plan</td>
<td>R</td>
</tr>
<tr>
<td>7</td>
<td>Initial process capability studies</td>
<td>R</td>
</tr>
<tr>
<td>8</td>
<td>Packaging, labelling standard, and documentation</td>
<td>R</td>
</tr>
<tr>
<td>10</td>
<td>Customer-specific requirements</td>
<td>R</td>
</tr>
<tr>
<td>10.1</td>
<td>Dimensional/Nondimensional results</td>
<td>R</td>
</tr>
<tr>
<td>10.2</td>
<td>Initial manufacturing performance studies</td>
<td>R</td>
</tr>
<tr>
<td>11</td>
<td>PPAP Approval Form (or equivalent)</td>
<td>S R</td>
</tr>
</tbody>
</table>
PPAP Approval Form

Purpose: Communicate acceptance of PPAP

Multiple formats accepted

Includes PPAP Status

AS9145 5.3.1 Production Part Approval Process Submission Disposition

The PPAP submission shall be dispositioned as follows:

a. Approved – Indicates that all PPAP requirements have been fulfilled. The organization is therefore authorized to ship product.

b. Interim Approval – Indicates that all PPAP requirements have not been fulfilled; however, the organization is authorized to ship product under the conditions/restrictions specified by the customer.

c. Rejected – Indicates that the PPAP requirements have not been fulfilled and the organization is not authorized to ship product.
Resubmission of PPAP

AS9145, Section 5.4:

A PPAP resubmission is required when a **previously approved product** or process undergoes a change (reference 9102 standard) or for a correction of a discrepancy on a previous submission.

**Previously approved product** = Previous submission

OR

**Previously approved product** = Previously approved FAI (Existing/Legacy)

Reference section on Demystifying APQP for Management of Change
DEMystifying APQP Phases 1 to 4 and the link with PPAP

KARL EVANS
APQP TECHNICAL PROJECT MANAGER
ROLLS-ROYCE

I am one of the original writing team members who released AS91945 and Team lead for AS13100 APQP and PPAP. Since 2011 I have been actively involved in the deployment of PPAP and in recent years APQP. During my career I have worked in many functional roles and involved in various industries. This helps be to relate to APQP and PPAP in the context of cross functional team working and usage during NPI, design change, Works Transfers and manufacturing process changes.
AS13100 APQP and PPAP

Requirements

Best Practice

AS13100 Published 2021

AS9145 Published 2016

AS13100 APQP & PPAP

AS9145

AS13100 APQP & PPAP

AS13100 / RM13145 APQP & PPAP

STANDARDS

This document slide does not contain ITAR or EAR technical data. The content of this presentation slide is proprietary and confidential information of the AESQ. It is not permitted to be distributed to any third party without the written consent of the AESQ.
Why APQP & PPAP for Aerospace?

The primary objective is to **improve quality and reduce cost. Higher quality** is synonymous with **increased product safety.**

### Cost of Quality through Product Life Cycle

- **Development**
  - APQP & PPAP
  - Current State

- **Production**

**DEVELOPING PRODUCT & /OR PROCESSES WHEN IN PRODUCTION IS COSTLY –**
- Redesign
- Re-qualifications
- Escape Investigations

**Source info…**

Proactive tools **focuses cross-functional teams on risk identification & mitigation** early in the process.

Products reach **faster maturity with fewer engineering changes and defects** in the early stages of production & product use.

Provides a **foundation for successful ongoing change management** – design and/or manufacturing change, Works Transfers.

---

AESQ – Aerospace Engine Supplier Quality Strategy Group

This document slide does not contain ITAR or EAR technical data. The content of this presentation slide is proprietary and confidential information of the AESQ. It is not permitted to be distributed to any third party without the written consent of the AESQ.
View APQP as a Flight Path

VIEW APQP AS A FLIGHT PATH FOR MANAGING PRODUCT AND / OR PROCESS CHANGE

Planning deliverables
Get off the ground...

APQP & PPAP Elements
Specifics we do on the journey...

APQP & PPAP Events
Our flight path checks....
Does everything apply?
IT IS CONFIGURABLE FOR VARIOUS CHANGE SITUATIONS

Each and everyone must be used every time?

Planning deliverables
Get off the ground...

APQP & PPAP Events
Our flight path check...

APQP & PPAP Elements
Specifics we do on my journey...

Configure for the “Change Situation”
Use of Change Situations
RM13145 MAPS CHANGE SITUATION AGAINST PHASES, EVENTS AND ELEMENTS

Configure for the Change Situation

Product Design

Transfer (no product design change)

Process (no product design change)

NEW CHANGE

NEW CHANGE

A to B

APQP Phase

| New Product Design | Product Design | Process from one facility to another | Processing of new product models | Processing of existing product models | Identification of new requirements | New Change
|-------------------|----------------|--------------------------------------|----------------------------------|-------------------------------------|----------------------------------|-------------
| X                 | X              | X                                    | X                               | X                                   | X                                | Limited     |
| X                 | X              | X                                    | X                               |                                     | X                                | Limited     |
| X                 | X              | X                                    | X                               |                                     | X                                | Limited     |

Change Situations
(as guidance, move left to right until relevant)
Green refers to Non-Product Changes

AESQ – Aerospace Engine Supplier Quality Strategy Group
This document slide does not contain ITAR or EAR technical data. The content of this presentation slide is proprietary and confidential information of the AESQ. It is not permitted to be distributed to any third party without the written consent of the AESQ.
APQP Phase 1: Planning

When getting off the ground, any change situation will benefit from good planning.

Requirements Capture

Plan Creation

KO → PDR

Product Development Process (PDP)

Phases of Advanced Product Quality Planning (APQP)

Aerospace Engine Supplier Quality Strategy Group

This document slide does not contain ITAR or EAR technical data. The content of this presentation slide is proprietary and confidential information of the AESQ. It is not permitted to be distributed to any third party without the written consent of the AESQ.

Planning deliverables

What we already know

Needs and wants

Critical for final success

Find out best practices

A. Product Design Requirements/specs
B. Project Targets
C. Preliminary CI / KC’s
D. Preliminary BOM
E. Preliminary process flow diagram
F. SOW review
G. Preliminary sourcing plan
H. Project Plan

Critical for final success

Assumptions

Voice of Customer

History, Lessons learnt

A. Product Design Requirements/specs
B. Project Targets
C. Preliminary CI / KC’s
D. Preliminary BOM
E. Preliminary process flow diagram
F. SOW review
G. Preliminary sourcing plan
H. Project Plan

ANNEX D

Needs and wants

Voice of Customer

History, Lessons learnt

A. Product Design Requirements/specs
B. Project Targets
C. Preliminary CI / KC’s
D. Preliminary BOM
E. Preliminary process flow diagram
F. SOW review
G. Preliminary sourcing plan
H. Project Plan

Planning deliverables

What we already know

Needs and wants

Critical for final success

Find out best practices

A. Product Design Requirements/specs
B. Project Targets
C. Preliminary CI / KC’s
D. Preliminary BOM
E. Preliminary process flow diagram
F. SOW review
G. Preliminary sourcing plan
H. Project Plan

ANNEX D

Needs and wants

Voice of Customer

History, Lessons learnt

A. Product Design Requirements/specs
B. Project Targets
C. Preliminary CI / KC’s
D. Preliminary BOM
E. Preliminary process flow diagram
F. SOW review
G. Preliminary sourcing plan
H. Project Plan
RM13145 Project Plan Toolbox

PRACTICES FOR CREATING THE PROJECT PLAN

Plan Creation

Requirements Capture

Configured for the Change Situation

Prelim. Concept

Configure for the "Change Situation"

APQP & PPAP Application Matrix(s)

APQP & PPAP Events

APQP & PPAP Elements

Activities, timing and ownership

Organisation

H: Create Project Plan

☐ Design
☐ Develop
☐ Validate

AESQ – Aerospace Engine Supplier Quality Strategy Group

This document slide does not contain ITAR or EAR technical data. The content of this presentation slide is proprietary and confidential information of the AESQ. It is not permitted to be distributed to any third party without the written consent of the AESQ.
It’s a Team Sport...
SUCCESS IS THROUGH CROSS FUNCTIONAL TEAM(S). RACI PROVIDE CLARIFICATION FOR THOSE INVOLVED

Responsible
Accountable
Consult
Inform

...For each Element

27
(APQP) > Activity

Design
Develop
Validate
APQP Phases 2 and 3 – Design and Development
THE ACTIVITIES WHEN INFLIGHT THAT DESIGN AND DEVELOP PRODUCTS AND / OR PROCESSES

APQP & PPAP Elements

Product Design and Development
1. DESIGN RECORD and BOM
2. DESIGN RISK ANALYSIS (DFMEA)
3. DESIGN FOR MANUFACTURE
4. PRODUCT CI and KC
5. PRELIMINARY SOURCING PLAN RISK ANALYSIS
6. PACKAGING SPECIFICATION
7. DESIGN VERIFICATION/VALIDATION RESULTS

Process Design and Development
8. PROCESS FLOW DIAGRAM
9. FLOOR PLAN LAYOUT
10. PFMEA
11. TEST / INSPECTION PLAN
12. PROCESS KEY CHARACTERISTICS
13. CONTROL PLAN (Pre-Launch / Production)
14. PACKAGING, PRESERVATION, LABEL/PART MARKING
15. PRELIMINARY CAPACITY ASSESSMENT
16. WORK STATION DOCUMENTATION
17. SUPPLY CHAIN RISK MANAGEMENT PLAN
18. MSA PLAN

Aerospace Engine Supplier Quality Strategy Group
Prepared by:
PRODUCT CI and KC
DESIGN FOR MANUFACTURE

Potential Failure Modes
PACKAGING, PRESERVATION, LABEL/PART

Potential Failure Effects

FMEO Origin Date:

Responsible:
Responsibke:

Process / Product Failure Modes and Effects Analysis (FMEA)

How Severe is the Effect to the Customer?
How of often does cause or FM occur?
What are the existing controls and procedures (inspection and test)?
What are the actions for reducing the cause, or improving control procedures (inspection and test)?

AESQ – Aerospace Engine Supplier Quality Strategy Group
This document slide does not contain ITAR or EAR technical data. The content of this presentation slide is proprietary and confidential information of the AESQ. It is not permitted to be distributed to any third party without the written consent of the AESQ.
APQP Phases 4 – Validation

THE ACTIVITIES WHEN IN FLIGHT THAT VALIDATE PRODUCTS AND / OR PROCESSES

- **FAI**
- **PA**
- **PL**

**APQP & PPAP Elements**

19. PRODUCTION PROCESS RUN(S)
20. MSA STUDIES
21. INITIAL PROCESS CAPABILITY STUDIES
22. DIMENSIONAL and NON-DIMENSIONAL RESULTS
23. PRODUCT VALIDATION RESULTS
24. INITIAL MANUFACTURING PERFORMANCE STUDIES
25. CUSTOMER SPECIFIC REQUIREMENTS (PPAP)
26. FIRST ARTICLE INSPECTION
27. PPAP SUBMISSION (incl. Approval Form)

---

“Without data you’re just another person with an opinion”

- W. Edwards Deming
APQP and PPAP Event Management and Behaviours

APQP and PPAP Events provide:

**Timing** - Plan & activities

**Synchronisation** – Supply Chain, Team to Team and between team members

**Approval decision points** - Go forward or Stop & Fix

RM13145 Events & Pass Criteria:

- Behaviours - Promote transparency of results & leadership values
- Build into your organisations Project Management & Review structures
- Clarify your RAPID per Event

AESQ – Aerospace Engine Supplier Quality Strategy Group

This document slide does not contain ITAR or EAR technical data. The content of this presentation slide is proprietary and confidential information of the AESQ. It is not permitted to be distributed to any third party without the written consent of the AESQ.
What about PPAP?

APQP is the SAT NAV (Activities). PPAP is the TRAFFIC LIGHT (Evidence)

(APQP) > Activity

(APQP & PPAP Elements)
Specifics we do on my journey...

Activity v Evidence

(PPAP) > Evidence

APQP

PPAP

Design

Develop

Validate

1 2 3

4 5 6 7

8 9 10 11

12 13 14 15

16 17 18

19 20 21 22

23 24 25 26 27
DEMystifying APQP
PHASES 5

ROBERT LATOUR
RUSSELL PALMITER

Technical Fellow for Manufacturing Process Control at Pratt & Whitney. He is responsible for the discipline strategy, procedures, proficiency and discipline health for process control methods across the company. In his 19-year career, Rob has held positions applying process control in Manufacturing Engineering, Module Engineering and Quality. He has been actively involved with the deployment of APQP and PPAP at Pratt & Whitney and across Raytheon Technologies. Rob is a Six Sigma Master Black Belt and holds a BS in Mechanical Engineering from Rochester Institute of Technology and a MS in Industrial Process Management from Rensselaer Polytechnic Institute.
Manage a Change for a Product in Production

**APQP AND PPAP BENEFIT BOTH NEW PRODUCT DESIGN AS WELL AS CHANGE TO PRODUCT AND PROCESS**

- Repeat APQP as an improvement cycle when triggered by product and/or process change
- Application of APQP and PPAP vary depending on change situation
- Utilize APQP to manage project targets, understand impact and risks of change as well as validate implementation
- Change situations
  - New product or product modification: Full application of APQP & PPAP
  - New facility or manufacturing process: Application of manufacturing related requirements
  - Process changes: Application of manufacturing related requirements appropriate to the scope of the change

<table>
<thead>
<tr>
<th>APQP Phase</th>
<th>New Product Design</th>
<th>Product Design Development</th>
<th>Transfer from one facility to another</th>
<th>New Process Design or new product design</th>
<th>Process Control Plan or material</th>
<th>Inspection Requirements</th>
<th>Tooling Requirements</th>
<th>Packaging Requirements</th>
<th>Failure Prevention</th>
</tr>
</thead>
<tbody>
<tr>
<td>1: Planning</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>2: Product Design and Development</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>3: Process Design and Development</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>4: Product and Process Validation</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
</tbody>
</table>

Meaning (level of application):
- X – Application in accordance to requirements.
- Limited – Application will be small scale.
- Blank – Application is unlikely.

[1] - Application by the organization of this phase will depend on their design and/or manufacturing responsibility. E.g.: Organizations that do not have design responsibility have limited requirements to fulfill in APQP Phases 2.
APQP & PPAP Events for a Change

CONNECT EVENTS WITH TIMING PLAN WILL ENSURE SUCCESSFUL PROJECT MANAGEMENT

- Configure events for the type of change
  - **KO**: Evaluate scope of change including technical, quality and cost targets and timeline
  - **PDR**: for process change: Demonstrate that the preliminary proposed process will meet customer requirements with acceptable risk and constraints
  - **FA**: Assess confidence that new process has potential to produce product design during production
  - **PPP**: Planning for new or modified process resources is suitable for the level of complexity being managed
  - **CDR**: Applicable for new product design or design changes only
  - **PRR**: New production process is appropriately defined, documented and ready for production
  - **IPA**: Demonstrate that products produced with new or modified process meet defined design intent
  - **PA**: Confirm performance of the new or modified process against quality targets
  - **PL**: Confirm that new or modified process demonstrates controlled and capable full-scale production

**BEST PRACTICE**
APQP and PPAP Elements for a Change

SCOPE APPLICABLE ELEMENTS TO DOCUMENT AND APPROVE SUCCESSFUL CHANGE

- Scope the APQP & PPAP Elements based on the potential impact on the change
- For a new or modified process:
  - Evaluate and update the process design documents (e.g., PFD, PFMEA, Floor Plan Layout) to assess the potential impact and risk of the change
  - Understand supply chain impacts through capacity assessment and supply chain risk management plan
  - Validate implementation of the change through updates MSA studies, initial process capability studies, etc. within the scope of the change
  - Complete FAI and PPAP approval
Polling

Becky Lemon
Industry Program Manager
SAE ITC

Please answer the Survey Questions when asked (they are anonymous).

(a) Use the poll function...

How well is your business in deploying APQP?
1. Not capable and have no plan to facilitate capability.
2. Not capable and have a plan to facilitate capability.
3. Capable and have no improvement plan to increase capability.
4. Capable and have an improvement plan to increase capability.

(b) Use the chat function...

What addition topics would you like use to cover in future webinars?
VIEW THE POLLING RESULTS
SUMMARY & CLOSE
Summary

All resources will be available on the AESQ website within a few days.

An email will be sent to all registrants with a link.
THANK YOU FOR PARTICIPATING
How to Answer Live Poll Questions (September 28)

1. Scan the QR Code with your cell phone
2. Enter the Password
   zsh8vd
3. Answer Polls Questions
How to Answer Live Poll Questions (September 29)

1. Scan the QR Code with your cell phone
2. Enter the Passcode
   5fbezf
3. Answer Polls Questions