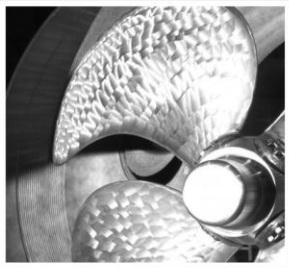
PPAP

Rolls-Royce

Production Product Approval Process

Version 0.1
June 2013

Supplier Hand Book



Supplier PPAP Hand Book

Rolls-Royce

This document

- Provides guidance on the Production Product Approval Process (PPAP) standard used by Rolls-Royce and should not be used as a stand-alone document (see SABRe)

  The Rolls-Royce standard is modelled upon AIAG's PPAP (Production Part Approval Process) but differences exist given the distinctive requirements of Rolls-Royce and the sectors it trades in. The term PPAP (Production Product Approval Process) is used throughout to describe the Rolls-Royce version of this process and the corresponding SABRe requirements opposed to AIAG PPAP Book.

- Is for guidance only, all requirements of PPAP are specified within SABRe.
- This document may be updated periodically (see change history) and updates will be published on the Supplier Global Portal.
- To gain access to associated training see http://suppliertraining.industryforum.co.uk
- This document has been structured to be printed in booklet format

Content

List of Figures, Tables and Appendices

Introduction to PPAP (Production Product Approval Process)

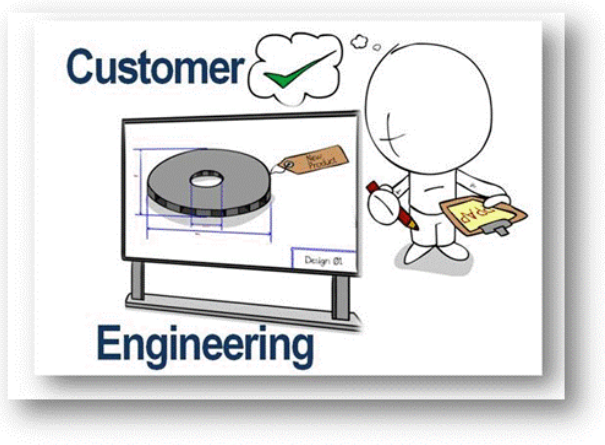
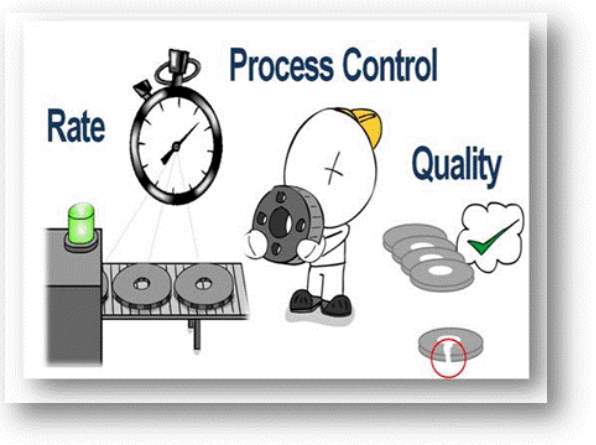
Purpose of PPAP:

When introducing a new product/process/facility (or changing existing ones) PPAP is used to confirm that the right activities (and outcomes) have taken place to ensure production readiness of the product and manufacturing process.

Approval of the Production Submission Warrant (PSW) and customer submission by the associated Rolls-Royce business unit confirms that the right activities and outcomes have taken place.

A significant proportion of the data used to judge production readiness is collected during the Production Process Run; which means making several products (forgings, casting, components, units, sub-assembly or assembly) using the complete manufacturing process that is intended for full production.

Conclusion of PPAP will demonstrate that:

Engineering requirements are properly understood and verified	Manufacturing quality and rate potential exists
	
• All customer design definition and specification requirements are properly understood, accounted for, verified and recorded by the production supply organisation.	• The manufacturing process / tool / facility have the potential to produce product consistently, meeting these requirements during an actual production process run, at a quoted production rate.

PPAP and IPPR (Integrated Product & Production Readiness)

Rolls-Royce is introducing an enhanced and streamlined Product Introduction process called IPPR (Integrated Product and Production Readiness) and the requirements are defined within SABRe 2, Chapter B. Illustrated below is the landscape for this process. As previously described, PPAP provides a confirmation of both product and manufacturing process production readiness and the right activities that deliver this. These are the PPAP Elements and Process Management tasks, which are recognised by many companies in various industries as important enablers to early production readiness.

Figure 1 illustrates the relationship between these PPAP Elements (blue squares) and the process landscape themes, which provide a clear target for Product Introduction activities to aim for. Completion of PPAP signifies a transition from Pre-Production to Production and defines both product and process as Production Ready.

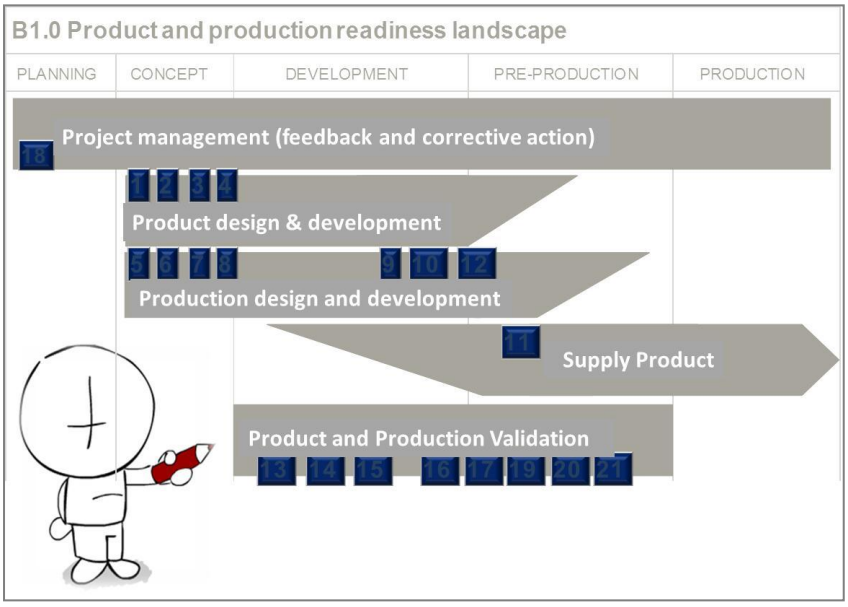


Figure 1: PPAP relationship with IPPR (Integrated Product & Production Readiness)

PPAP Provides

1. A single supply chain standard :

- Part of Rolls-Royce Integrated Product & Production Readiness process
- Consistent requirements across both internal and external supply chains and sectors

2. A common approach:

- Deployed in many industries
- Tailored to suit Rolls-Royce sectors and business needs

3. A clear end point :

- Clear target for Product Introduction activities to aim for
- Completion defines both product and process as Production Ready

Introduction to PPAP Supplier Hand Book

Structure

This handbook structure follows the topics below (A and 1 to 5) with the purpose of:

- Providing suppliers with suitable insight and guidance to assist them in becoming PPAP Capable
- Creating a common language between Rolls-Royce and suppliers when dealing with manners relating to PPAP.

Figure 2 illustrates these topics, 1 to 5 refers to the steps within a suggested procedure and A to the overall management of this procedure:

A. PPAP Management

1. Identify the PPAP Deliverables
2. Plan the activities that will deliver Customer Approval
3. Manage initial product approval
4. Manage final production product approval sign-off
5. Is the PSW Approved?

Figure 2 also illustrates the relationship between this procedure and the structure of SABRe Chapter C as a guide to detailed requirements that influence the identified step (see SABRe Section Reference). See SABRe for the specific requirements, these SABRe sections can be briefly described as:

SABRe C1.1 General Requirements: Have a documented procedure for the suppliers organisation and PPAP, and metrics that monitor progress and satisfaction of key milestones, along with a PPAP Co-ordinator who is the responsible officer for the product and their organisation

SABRe C1.3. PPAP File: Have a PPAP File at the manufacturing site with evidence of compliance, results and corrective actions associated with the developing (or developed) production standard.

SABRe C1.4. Production Process Run: Carry out a production process run or runs to produce a set quantity of products, to demonstrate performance of the production standard through evaluation.

SABRe C1.5. Submission Level: Identifies the information submitted to the customer, associated actions and related PPAP Elements.

SABRe C1.6 PPAP Element Details: Provides detail on these PPAP Elements content and how information is recorded, and provided.

SABRe C.2. PPA Submission Status: Provides detail on the related action as a result of the customer disposition (approved, interim or reject) and the PPA (Production Product Approval) Status: A to E or R.

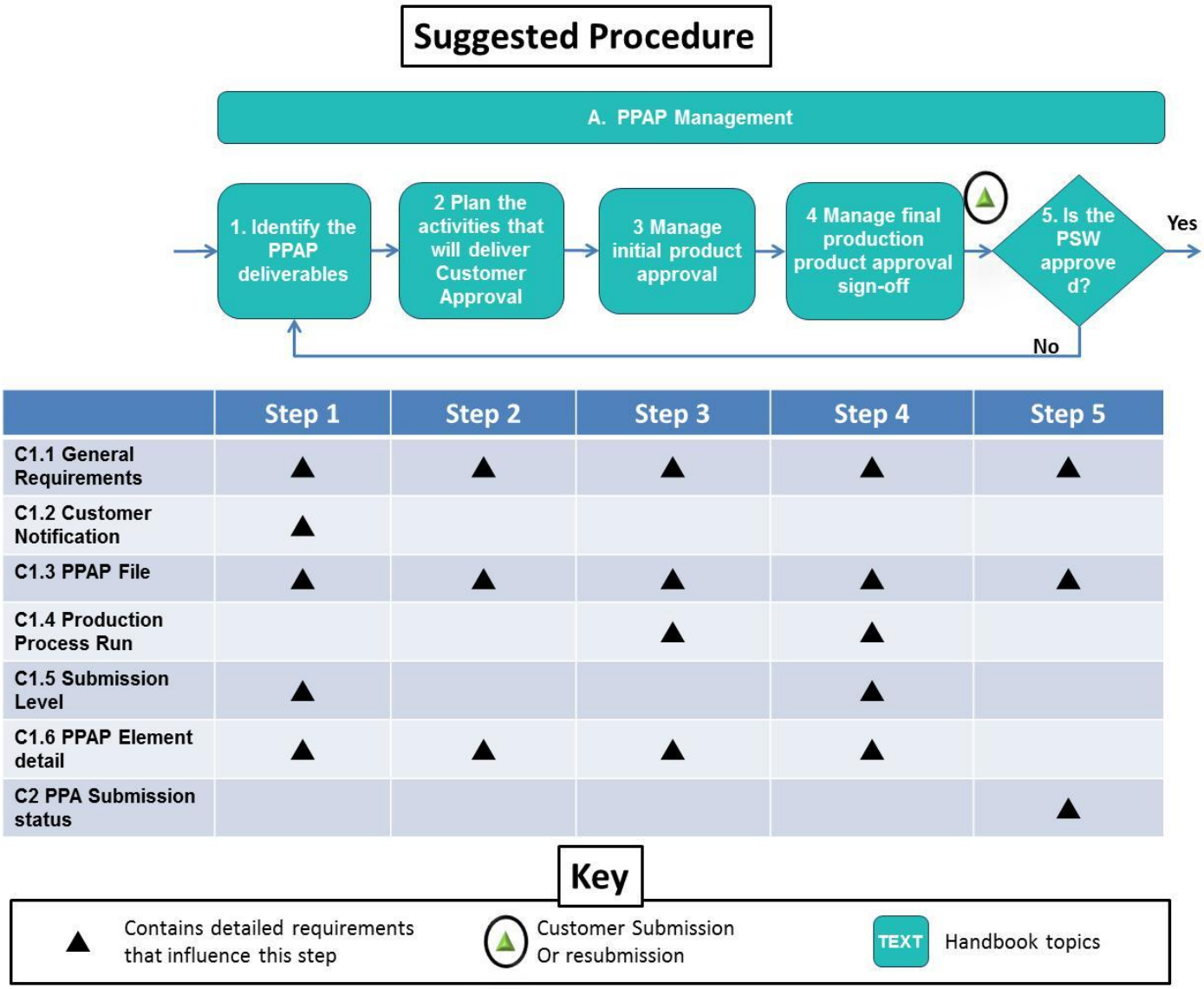
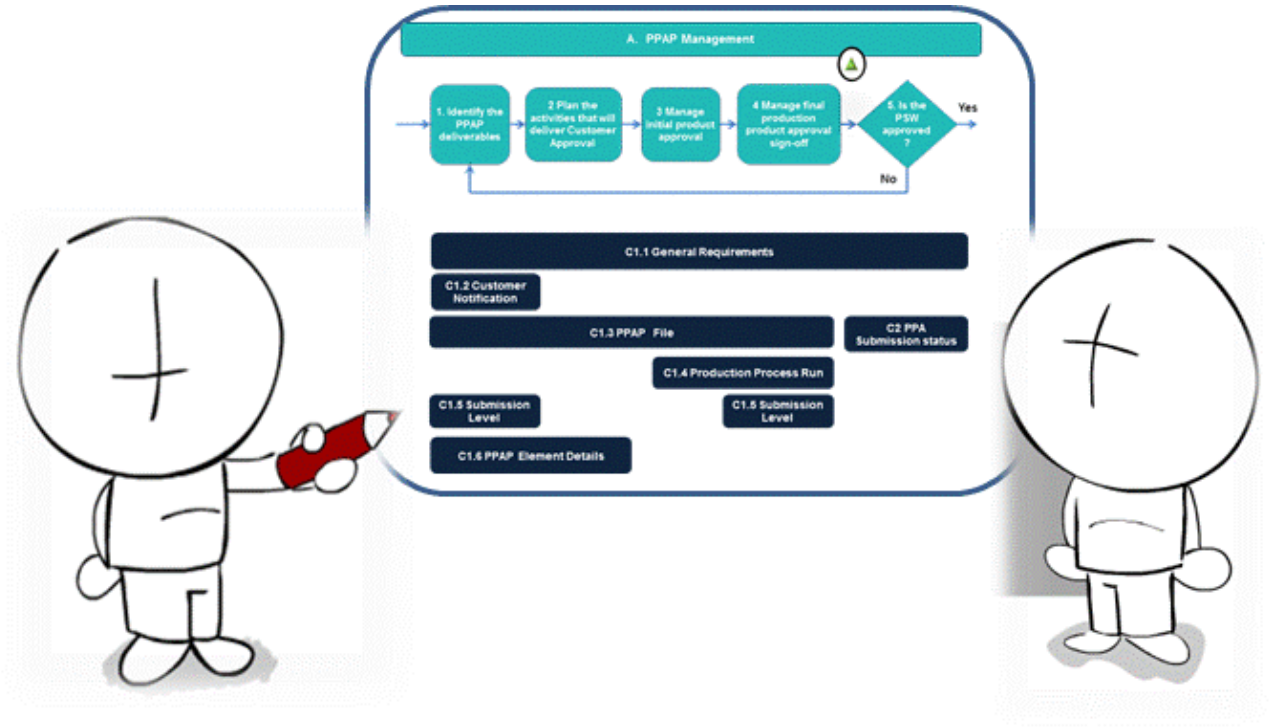


Figure 2: Illustration of PPAP Hand Book topics and SABRe PPAP Requirement

Supplier PPAP Hand Book

The PPAP Handbook Topics



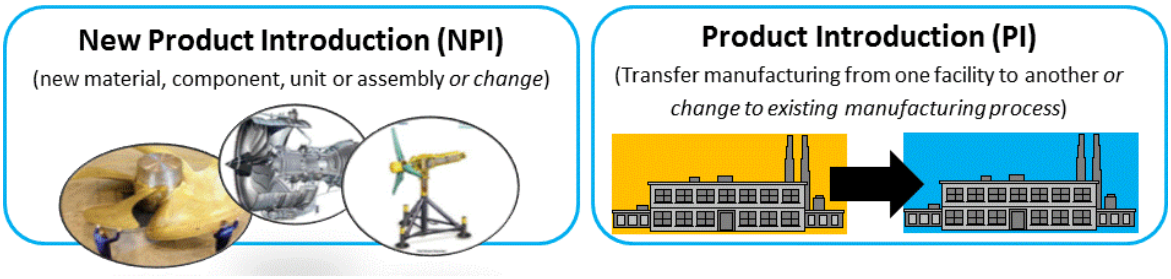
- **PPAP Management**
- **Identify the PPAP Deliverables**
- **Plan the activities that will deliver Customer Approval**
- **Manage initial product approval**
- **Manage final production product approval sign-off**
- **Is the PSW Approved?**

For these topics, the majority of the section titles used are the same term as found within SA-BRe. For example: The following section "Establish a documented Procedure for PPAP" is the same term used within Chapter C 1.1. of SABRe.

PPAP Management

Establish a documented Procedure for PPAP

Within SABRe "establish a documented Procedure" refers to a procedure defined by the supplier, documented within their quality management system and integrated into the business process for New Product Introduction (NPI) or Product Introduction (PI) that satisfies PPAP requirements. The business process for NPI typically provides the overall project management framework which PPAP contributes to.



New Product Introduction refers to the introduction of a new product (casting, forging, component, unit or assembly) to a supplier's organisation. For example: new engineering design or product previously produced by a different company.

Product Introduction refers to a product that is produced by the supplier organisation and is subject to engineering change. For example: change to the manufacturing location.

The following steps are a suggested structure for a procedure, for each step key activities are itemised within figure 3 and topics 1 to 5 follow these steps.

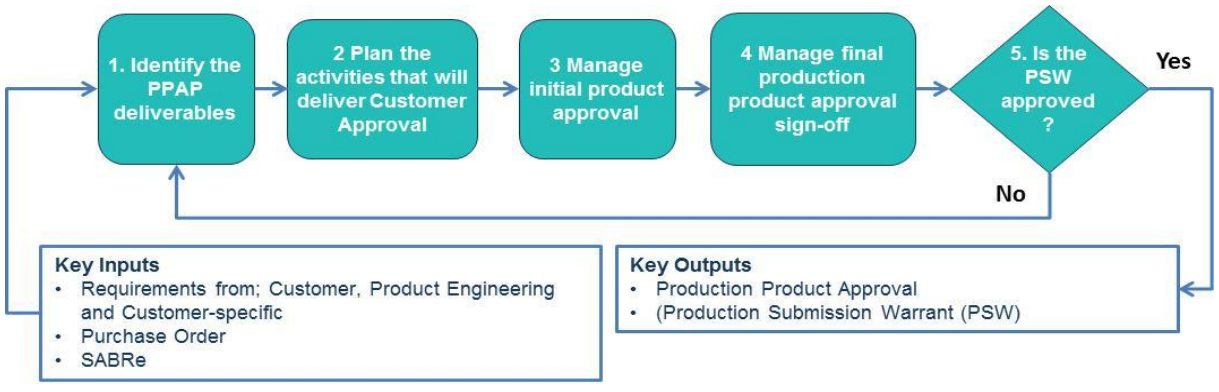


Figure 3: Suggested Procedure for PPAP

To help your understanding you will find that the PPAP Scenario at the rear of this document follows these steps and describes what happens for the NPI scenario used.

Table 1: Key activities for a PPAP Procedure

Step	Key Activities
1: Identify the PPAP deliverables	• Identify the PPAP Co-ordinator(s) for the product(s) • Identify PPAP deliverables for the product and organisation, including the requirements cascade (Customer, Engineering, SABRe and customer-specific) • If required and permitted agree any adaptation to this requirement with the Rolls-Royce Customer Authorised Representative (R-R CARe). • Establish a PPAP File
2: Plan the activities that will deliver Customer Approval	• Identify and include within the Project / Programme plan the PPAP deliverables and identify key milestone events such as production process run and customer submission(s). • Communicate these key milestones to the R-R CARe. • Update PPAP File with results of the planning
3: Manage initial product approval	• Conduct engineering approval processes • Release product against the applicable release process • Update PPAP File with results of these activities
4: Manage final production product approval sign-off	• Conduct a production process run and if appropriate involve the R-R CARe. (Customer witness). • Update PPAP file with results of the production process run and PPAP activities • Prepare a customer submission considering; required submission level, requirements of PPAP Elements and Production Submission Warrant. • If a compliance gap exists clearly define the non-compliance, provide an action plan to address these and commit to a date for re-submission. • Provide a customer submission, if required implement containment actions to ensure that only acceptable product is released to the customer.
5: Is the PSW approved?	• Upon receipt of the response to the customer submission, manage production in accordance with the result of the customer disposition.

Metrics that monitor progress and satisfaction of key milestones

Metrics provide both the supplier and Rolls-Royce with meaningful information on progress (see Topic 2 and Monitoring of progress) of key milestones linked to PPAP process management such as:

- Dates for when PPAP elements will be completed and evidence entered into the PPAP file
- Provision and availability of product; casting, forging, component, unit and/or assembly
- Implementation of the production process
- The start and finish of the production process run (see duration of Production Process Run)
- Customer submission date

PPAP Coordinator

Leadership of PPAP is by an accountable and competent person (the PPAP Co-ordinator). An important step in PPAP is for the supplier to designate a PPAP Co-ordinator(s), who will be the single-point-of-contact between themselves and the Rolls-Royce Customer Authorised Representative (R-R CARe) on anything related to PPAP. The supplier's PPAP procedure would define their responsibilities and required competences.

The Rolls-Royce Customer Authorised Representative (R-R CARe) is referred to in SABRe as the Rolls-Royce technical authority. The following describes their role.

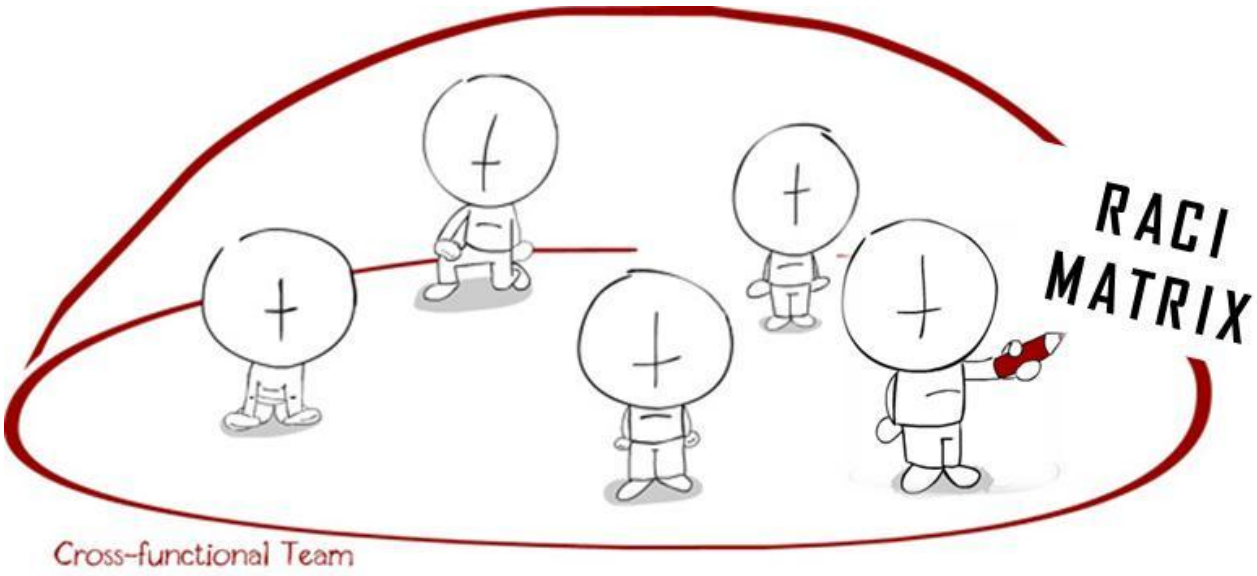
Table 2: Responsibilities of PPAP Coordinators

Lead	Deliver	Verify
For their designated product; The PPAP Co-ordinator is the person accountable for ensuring that the PPAP requirements are understood and transferred into deliverables for the product within scope and verifies that all necessary activities are implemented and monitored to satisfy PPAP. Specifics are below.		
• Manage the cascade and communication of customer requirements. • Champion the development of plans to achieve PPAP deliverables and Key Milestones. • Provide leadership or support to facilitate involvement of experienced personnel. • Manage reviews to track progress and ensure PPAP development is to plan.	• A fully populated and compliant PPAP File. • Manage an effective customer submission process. • Customer Satisfaction	• Verify that the PPAP requirements are met on behalf of their organisation. • Act as the accountable officer for PPAP within the suppliers business

Teamwork (supplier's NPI/PI Team)

Teamwork underpins PPAP during NPI/PI and the team is responsible for delivering the PPAP Deliverables. Responsibility for each deliverable and who should be informed of their results and/or consulted prior to decisions/action will vary for the different members within the supplier's NPI/PI team. It is a good idea to produce a team matrix by listing the PPAP Deliverables in one axis, the team roles in the other axis and identify the relationships between these as:

- **R** - Responsible (actually completes the task)
- **A** - Accountable (ensures the task is completed)
- **C** – Consult (Consulted prior to a decision)
- **I** – Informed (informed after decision)



The matrix benefits all of the team members and enables efficient NPI/PI by providing all who are involved with a cross-functional view of who is involved as NPI/PI progresses.

Identify the PPAP deliverables

PPAP Deliverables

Identify the PPAP deliverables has a strong link to "Review of requirements related to the product" in SABRe Chapter B. An important starting point is to understand which of the PPAP 21 Elements are applicable (along with the specifics of the requirements) and what process management tasks are necessary to ensure success. These are the PPAP Deliverables, the summary of these are below (dark blue are the elements, light blue are the tasks). The submission level for the product is a key input to this (see topic 4: Submission Level).

When identifying the PPAP Deliverables for the product consider sources of information like; Customer, Product Engineering and Customer Specific Requirement and SABRe

The below front sheet provides a method to identify the applicable / non-applicable PPAP elements as required by SABRe (see Chapter C, PPAP File). When multiple products are involved and in conjunction with a Product Configuration Tree, add an additional 'required' column for each product to develop a PPAP Applicability Matrix. Product Configuration Tree can also be referred to as a cascade diagram or product family tree or Visual Bill of Material.

Table 3: PPAP File Front Sheet

PPAP File Front Sheet			
Ref	**PPAP Deliverable**	**Required (Y/N)**	**Comment**
1	Product Definition / Engineering Specification		
2	Authorised Engineering Change documents		
3	Customer Engineering Approvals		
4	Design Failure Mode and Effects Analysis (Design FMEA)		
5	Process Flow Diagram		
6	Process Failure Mode and Effects Analysis (Process FMEA)		
7	Control Plan		
8	Test / Inspection Criteria and Planning		
9	Qualified Laboratory Documentation		
10	Packaging and Labelling Standards and Documentation		
11	Sample Production Product		
12	Measurement System Analysis Studies		
13	Dimensional Results		
14	Records of Material / Performance Test Results		
15	Initial Process Studies		
16	Process Control Surveillance Results		
17	Initial Manufacturing Performance Studies		
18	Customer Specific Requirements		
19	First Article Inspection Report (FAIR)		
20	Process Control Document (PCD)		
21	Production Submission Warrant (PSW)		
A	Provision and availablity of product for the production process run		
B	Implementation of production manufacturing		
C	Production Process Run (PPR)		
D	Customer Submission Date		
E	PSW Disposition (& associated Customer Submission)		

Description of the PPAP Deliverables

This is for reference only, procedural requirements of PPAP are stated within SABRe Chapter C and this is not a replacement for the definition of these requirements

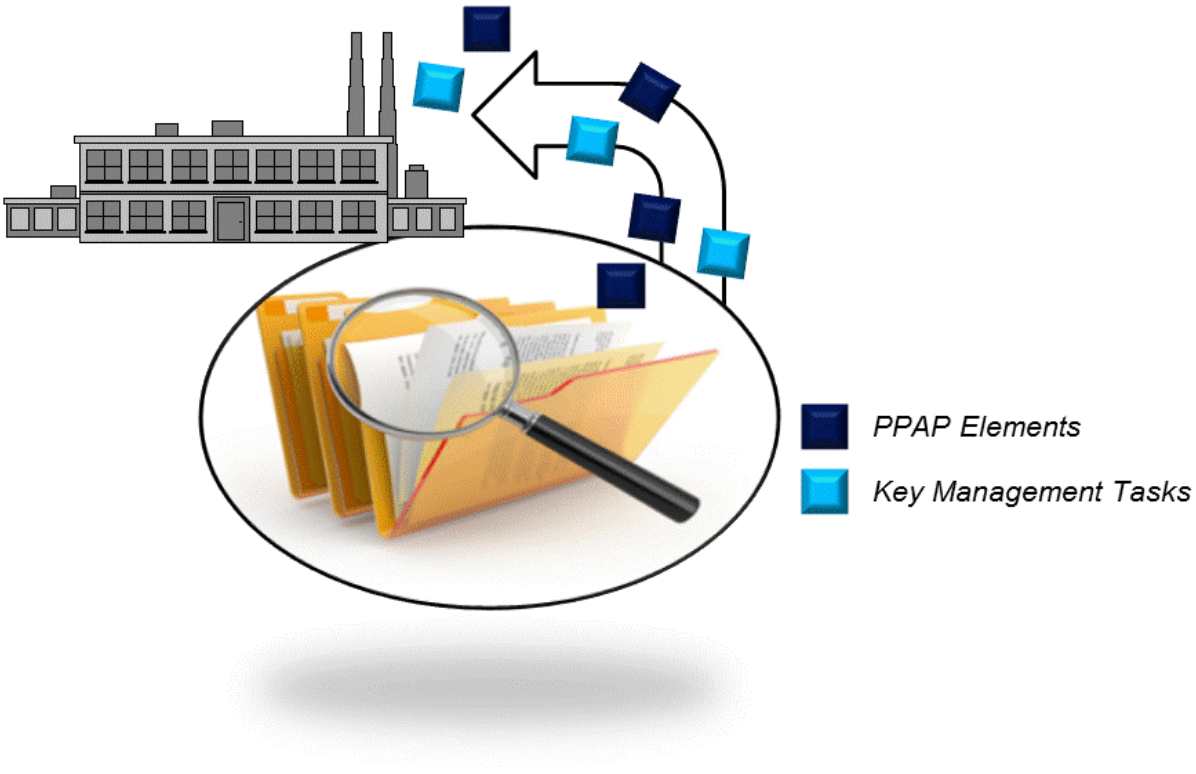
Ref	Description	Ref	Description
1	**Product Definition/Engineering Specification:** This relates to Drawings, Models, and Engineering Specifications specific to defining the product.	14	**Material / Performance Test Results:** This relates to data collected during the production process run in reference to a set number of products, material/performance test values and the determined conformance.
2	**Authorised Engineering Changes:** This relates to changes not yet recorded in the product definition but incorporated in the product	15	**Initial Process Studies:** This relates to CCF's defined by the customer and the capability studies carried out to determine capability values and achievement of acceptance standards.
3	**Customer Engineering Approvals:** This relates to engineering approvals associated to the nature of the product.	16	**Process Control Surveillance Results:** This relates to the completion on the Process Control Surveillance activity for the manufacturing process and evaluated against a set criteria.
4	**DFMEA:** This relates the Design Failure Mode Effects Analysis (DFMEA) task and results.	17	**Initial Manuf. Performance Studies:** This relates to data collected during the production process run in reference to a set number of products, quality and capacity data and the determined rate potential of the process.
5	**Process Flow Diagram:** This relates to the schematic representation of the process flow, from the beginning to end.	18	**Customer Specific Requirements:** This relates to additional requirements that will benefit the verification/validation task. Typically, these would account for Sector or Product specific requirements, which are outside of the standard PPAP elements.
6	**PFMEA:** This relates the Process Failure Mode Effects Analysis (PFMEA) task and results.	19	**First Article Inspection Report:** This relates to the FAIR and all involved product (material, component, unit or assembly), providing a confirmation of approval.
7	**Control Plan:** This relates to the written description of the systems for controlling product and process.	20	**Process Control Document:** This relates to capability approval and the PCD document that records specified CCF's and reports on associated information.
8	**Test / Inspection Criteria and Planning:** This relates to planning and recording of all the necessary product verifications (inspections and when required tests) to be used during production that confirm conformance of the product.	21	**Production Submission Warrant:** This relates to the PSW form used to record customer submission and production product approval status / associated data and information.
9	**Qualified Laboratory Documentation:** This relates to any test/inspection defined as part of element 8, which would require laboratory approvals and the confirmation that these are in place.	A	**Provision and availability of product:** This relates to the planning, scheduling and availability of product used during the production process run. Sufficient product is used (and results) to satisfy the PPAP elements (dark blue) and to be representative of unique processes.
10	**Packaging and Labelling Standards:** This relates to the Packaging and Labelling requirements that have been planned and the suitability for the product and production process	B	**Implementation of production process:** This relates to the implementation of production intended manufacture: tool, machine, equipment, people, operating conditions etc.
11	**Sample Production Product:** This relates to any requested sample and the specifics of the request.	C	**Production Process Run:** This relates to the physical activities required by the requirements of the production process run. The results indicate the manufacturing potential for both process capability to produce conforming product in the actual production environment (Rate) and process capacity to support production quantities at a consistent quality level (Quality)
12	**MSA:** This relates to measurement system studies and result for each test/inspection used for all the product verifications and their achievement of acceptable standards.	D	**Customer Submission Date:** This relates to the date (no later than) when the customer submission is provided for disposition (the content is determined by Submission Level and Customer-Specific Requirements).
13	**Dimensional Test Results:** This relates to data collected during the production process run in reference to a set number of products, dimensional values and the determined conformance.	E	**PSW Disposition (and associated customer submission):** This relates to evaluation of the provided customer submission and result.

Customer Notification

Customer notification refers to change initiated by the supplier to production product or process that would call for PPAP and the need to obtain production product approval. For example: When manufacture is transferred from one facility to another facility within the supplier's organisation.

PPAP File

The PPAP file is a primary source of data, information and evidence in connection with the PPAP deliverables and is held at the manufacturing location. The hardcopy file can contain the actual evidence or simply provide links to the evidence, provided this is understandable upon customer review or request. The file is initiated (or reopened from a prior product introduction), early in the product launch cycle and developing as progress is made.



Both customer and supplier benefit from the data within the file in the following ways:

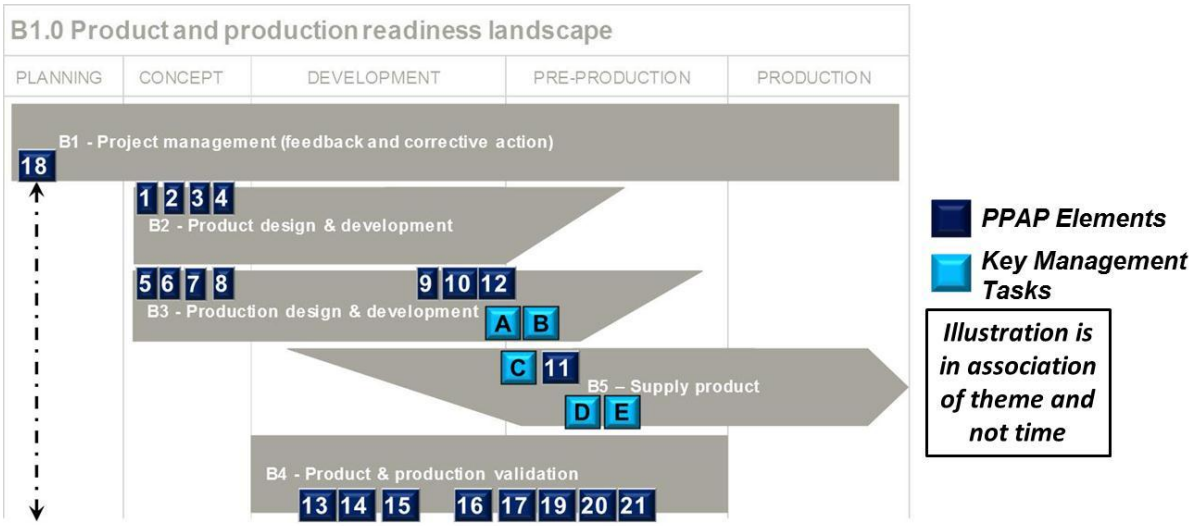
- It is a source of evidence for compliance audits.
- It is a reference and standard for manufacturing to consult during the life of a product's manufacture
- As a source of information;
    - To support an investigation into a quality or delivery concern
    - When planning the introduction of a product or process change, from an associated family

Plan the activities that will deliver Customer Approval

Integrating PPAP into the Plan

Plan the activities that will deliver Customer Approval has a strong link to Project Management in SABRe Chapter B. For example; When planning the Production Process Run the requirements would link to “Production planning/scheduling” and “Capacity planning/management”**.**

The project/programme plan, the title of which may vary (e.g.: Design Make Plan or Product Launch Plan or Manufacturing Launch Plan) will need to contain all key PPAP activities, timescales, resource requirements, authorisations and dependencies necessary to ensure that production product approval is achieved in a timely manner. Figure 4 illustrates the PPAP Deliverables and relationship with the associated SABRe Product and Production Readiness landscape. Good practice is to include in the plan all the titles below for the PPAP Deliverables and itemise for each; task, timing and person response.



PPAP Deliverables			
1	Product Definition / Engineering Specification	14	Records of Material / Performance Test Results
2	Authorised Engineering Change documents	15	Initial Process Studies
3	Customer Engineering Approvals	16	Process Control Surveillance Results
4	Design Failure Mode and Effects Analysis (Design FMEA)	17	Initial Manufacturing Performance Studies
5	Process Flow Diagram	18	Customer Specific Requirements
6	Process Failure Mode and Effects Analysis (Process FMEA)	19	First Article Inspection Report (FAIR)
7	Control Plan	20	Process Control Document (PCD)
8	Test / Inspection Criteria and Planning	21	Production Submission Warrant (PSW)
9	Qualified Laboratory Documentation	A	Provision and availablity of product for the production process run
10	Packaging and Labelling Standards and Documentation	B	Implementation of production manufacturing (equip, tools, operators & environment)
11	Sample Production Product	C	Production Process Run (PPR)
12	Measurement System Analysis Studies	D	Customer Submission Date
13	Dimensional Results	E	PSW Disposition (& associated Customer Submission)

Figure 4: PPAP Deliverables and SABRe Product and Production Readiness landscape

Certain key elements (e.g. Process Flow, FMEA, Control Plan, etc.) are prepared prior to the planned production process run(s) so that they are available and used to confirm the process.

> *Early completion of this planning will assist in identifying any constraints to achieving the PPAP requirements for evaluation by management and the Rolls-Royce technical authority.*

Monitoring of Progress

The PPAP Co-ordinator should lead an oversight review programme, which includes a planned schedule of reviews centred on the lead/deliver aspect of their role (see PPAP Management topic: PPAP Coordinator).

- The key question to answer is “are all the PPAP Deliverables on track?”

This should not be confused with the Production Process Run and subsequent evaluation of results. The key question to answer for this is “have all the PPAP Deliverables been achieved?

The content of the oversight review should regularly account for:

1. Review PPAP file and confirmation of the developing content (Such as documents present).
2. Progress of the Project Plan and PPAP Deliverables
3. Identification of risks or issues to address

The oversight continues up to the production process run and the results are feedback via programme management procedure to provide clarity on each of the PPAP deliverables as follows. Post production process run, continuation of this should take place when compliance gaps exist:

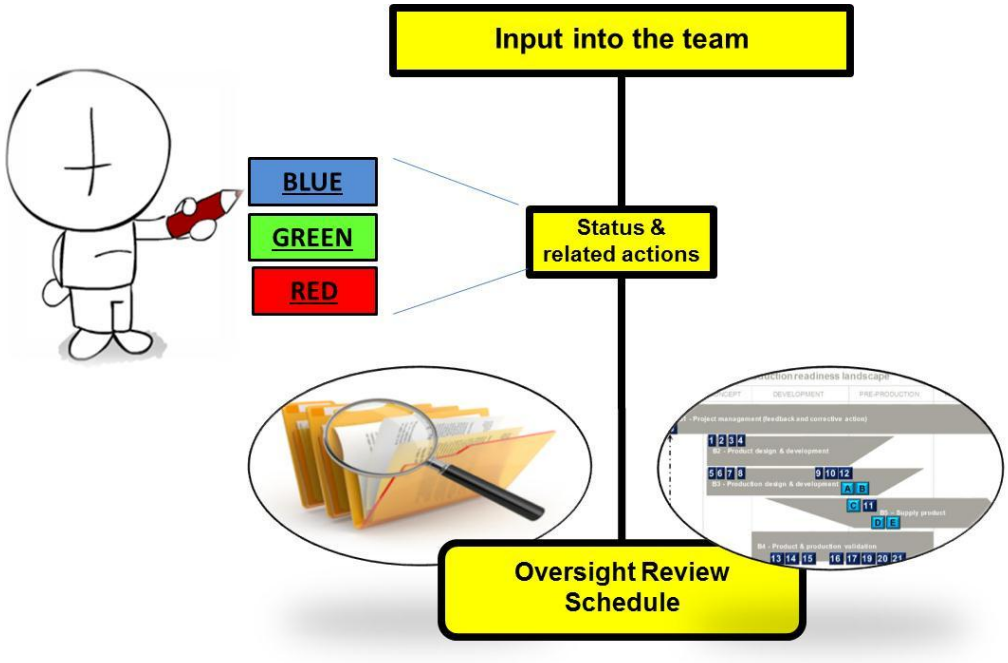
- Deliverable is **complete** to the required standard

or

- Target date(s) and deliverable is **on track** to achieve the required standard

or

- Target date(s) and/or deliverable are **at risk**.



Manage initial product approval

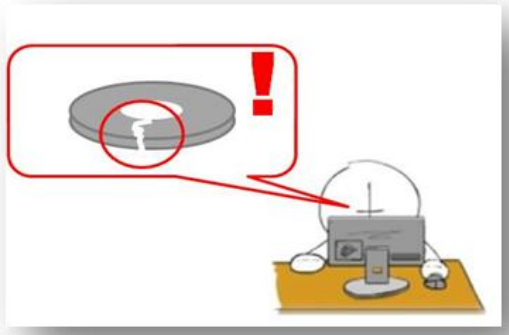
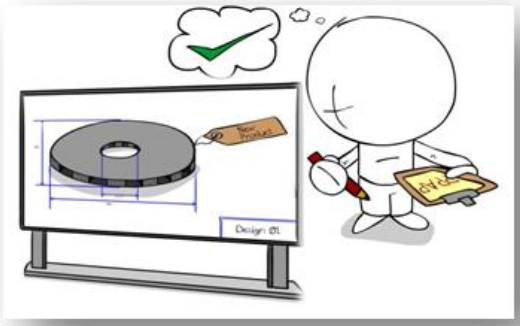
Engineering Approvals

This provides the link between the PPAP procedure and the business process(s) that manage supplier and customer engineering product approval to ensure that all the necessary engineering approval processes are integrated and their results noted.

Examples of customer product approvals are (see Chapter B): Definition Alteration Request (DAR), First/Last Article Inspection Report (FAIR/LAIR) and Fixed Process Approval.

When appropriate, this step of the procedure runs concurrently with the next step.

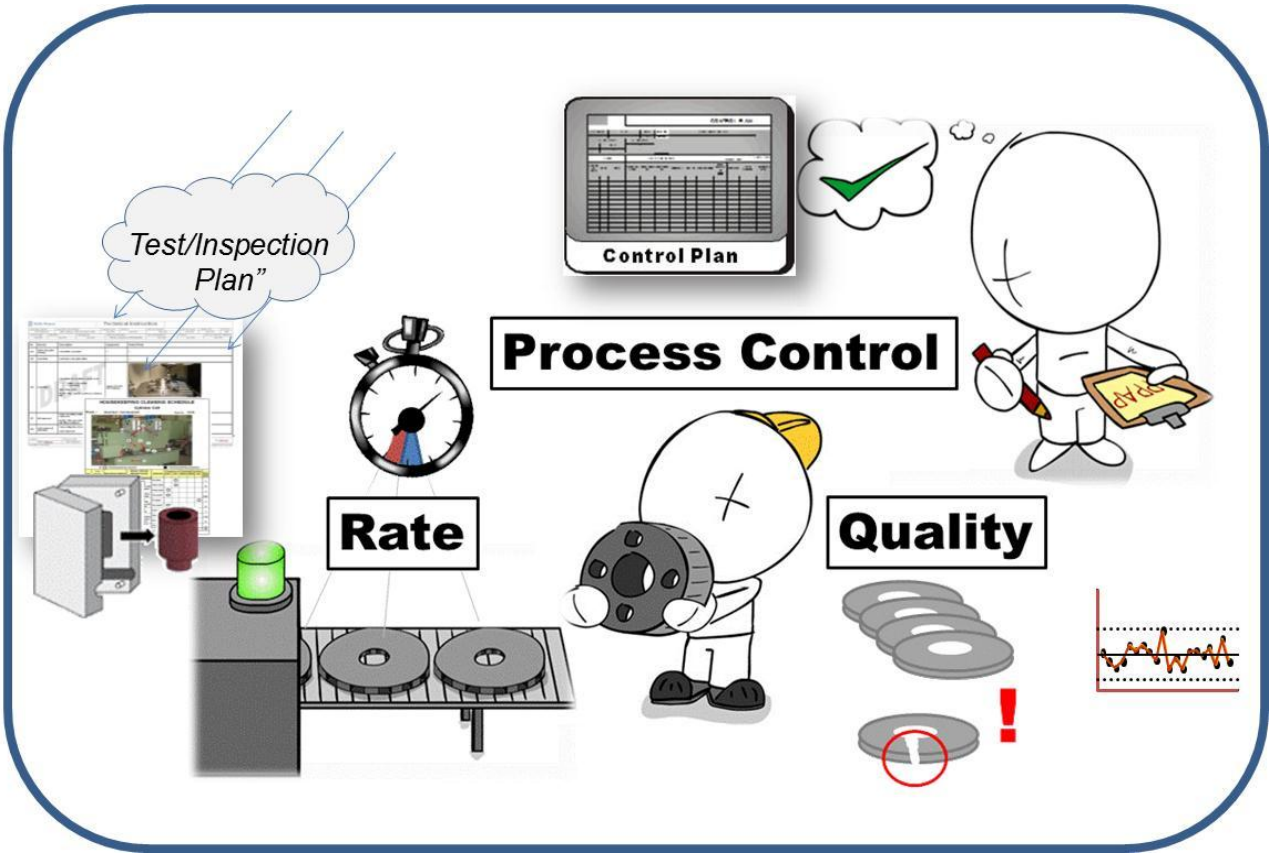
The engineering approval processes can be summarised as those that confirm the following:

Product design meets business and/or customer requirement	Process meets the product definition design intent
	
For example: Engineering acceptance of tests and reports as a result of tasks generated from a design verification plan	**For example:** Engineering acceptance of first article inspection report

Manage final production product approval sign-off

Production Process Run

The purpose of Production Process Run is to understand; The process' capability to produce conforming product (Quality), Its capacity to deliver production quantities at a consistently conforming level (Rate) and the sustainability (Process Control).



Carried out by the supplier this task may involve Rolls-Royce when the submission level indicates the need for a customer witness. The data, results and sufficient product obtained from the production process run are used to satisfy the requirements of the PPAP elements.

Use sufficient Product:

The specifics for each element are defined within the SABRe Chapter C, in some cases; this would require all the data and results. In other cases this would only require part of the data and results (i.e.: use sufficient product). As an example, dimensional report requires 5 parts minimum of the total produced, the measurement and monitoring is by the suppliers' personnel who randomly take this from separate batches.

The minimum is 25 for the production process run. The minimum of 25 products may alter when authorised by the Customer Authorised Representative and when significant volumes exist >25 or in circumstances where low production volumes exist <25.

Duration of the Production Process Run:

The greatest benefit is gained through a single event (back-to-back manufacture) and should be the primary goal. However, if this impacts the quality of the product (e.g. shelf life) or customer schedule demand does not facilitate this (e.g. long gaps between deliveries), then consideration is given to satisfying this through a number of events (involving the Customer Authorised Representative). Therefore, the duration (start to finish) will be governed by this and the number of products required for evaluation.

In all cases, the production process run must use the actual production process, facility, people, tools, equipment, etc. that make up the final production system. If the introduction of these cannot be achieved in time for the customer submission, this non-compliance would be identified as a gap in the submission and an action plan to resolve is developed and submitted.

Customer Witness

Customer witness is completed by the Customer Authorised Representative (or nominee), would as a minimum cover the following and may involve visiting the sub-contractor/sub tier as necessary:-

1. Review PPAP file and confirmation of the content (e.g.: Records and documents present).
2. Integrity of the results (e.g. MSA results, capability and capacity calculations produced to the required standard)
3. Conduct an independent Process Control Surveillance
4. Witness in part or full the execution of the production process run

Independent Process Control Surveillance is not to be confused with the suppliers responsibility for PPAP Element 16 (Process Surveillance Control results), which the supplier completes.

Submission Level

Submission levels are from SL1 to SL5, the Retention/Submission table can be found in SABRe and for each of the 21 PPAP elements any combination of the letters S, R, C, W are assigned for each of the 5 submission levels (example provided below). These letters are instructions on how each PPAP element, for a given submission level, should be managed and they are explained below. In all instances, supporting data for the PPAP elements is gathered regardless of the submission level set; the actual work that the supplier is required to do for SL1 is the same as that for SL5. The submission level only specifies the evidence that actually needs to be included in a submission to the Rolls-Royce technical Authority for a Production Submission Warrant (PSW) approval.

Example of PPAP Element and use of S, R, C and W

PPAP Element 1 to 21		Submission Level				
		SL 1	SL 2	SL 3	SL 4	SL 5
1	Product Definition / Engineering Specification	R	**S** R	**S** R	C R	**S** R **W**

S	Indicates that each element of the submission level that has S in the table will require the supplier to submit the documentation, results, data, etc to Rolls-Royce for evaluation. Documents used can be in an organisation-specific format unless the requirements state otherwise. E.g.: Mandates the use of a specific form.
R	Indicatesthat each PPAP element will require the supplier to prepare the documentation as normal but retain the documentation or product at their premises and undergo internal review and approval by the supplier.
C	Indicates that each element of the submission level that has a C in the table can be set as either (S) and/or (W). The supplier consults the customer to understand the specifics, in all cases this should be recorded as described in the customer specific requirements (PPAP Element 18).
W	Indicates a supporting data/information review at the manufacturing location, this is conducted by the Customer Authorised Representative or nominee witnesses (Referred to as Customer Witness).

Table 4: Retention and Submission Table Key

Organisation-specific means a format that is suitable to the suppliers operation and provides the required information / data / documentation in an understandable format to the Rolls-Royce technical authority

Customer Submission

In all instances, the customer submission must be prepared in line with the defined submission level, and submitted to the Customer Authorised Representative on the planned submission date with all necessary evidence of all applicable PPAP elements (including customer-specific requirements when specified).

The Submission Preparation Guide (see appendices) will assist in this task by providing suppliers with questions to consider, PPAP Element by PPAP Element, to evaluate the quality of the submission.

If the supplier believes that the PPAP submission has a compliance gap (e.g. Incomplete information or required task or results) then they as part of this submission:

- Identify the non-compliance
- Define an action plan to address this
- Commit to a date for re-submission.

The planned submission date is either before first production product is shipped or on a date agreed by the Customer Authorised Representative. Both Rolls-Royce and suppliers use this date to understand what the capability and capacity of the product's supply chain is, in time to address shortfalls before transitioning into full production at rate

Detailed guidance on how to complete the data and results documentation is provided on the Supplier Global Portal and within the briefing section for the following:

Table 5: Standard PPAP Documentation

Form Name	Reference	PPAP Element
Control Plan	CP	7
Test Inspection Criteria	TIC	8
Dimensional Results Report	DRR	13
Material Test Report	MTR	14
Performance Test Report	PTR	14
Process Control Surveillance form	PCS	16
Quality and Capacity Analysis Report	QCAR	17
Production Submission Warrant	PSW	21

The PPAP Co-ordinator verifies the requirements (as the accountable officer for their organisation) before making a submission to the Customer Authorised Representative.

Is the PSW approved?

PPA Submission Status

Production Submission Warrant (PSW) details the customer response and the PPA (Production Product Approval) Classifies the result of the disposition (e.g. Approved, Interim or Rejected) and if required identifies any actions necessary. The PPA status plan defines how the product is managed and where the response is not approved, detail the necessary corrective actions. The PPA status plan can be found on Global Supplier Portal, see SABRe section

As illustrated below, only A (Approved) confirms that the result is Production Ready.

An **Interim E or Reject status** identifies that the product quality does not meet requirements, however the differences are; the product is saleable (E) or is not saleable (Reject).

In both cases an **Interim C or D status** identifies that the product quality has met requirements, however the differences are;

- The manufacturing method capacity potential is not demonstrated proven (D)
- The production standard is using unplanned manufacturing to meet requirements (C)

Interim B status identifies that when using the production standard the product quality and capacity demonstration meet requirements, however outstanding PPAP requirements require satisfying.

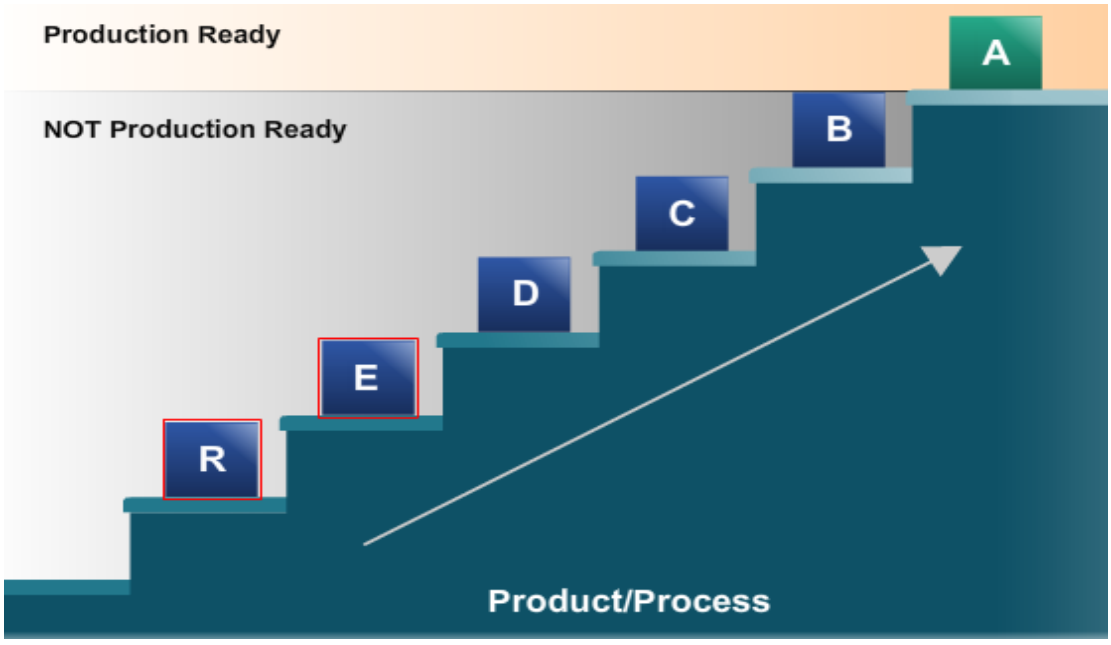


Figure 5: Product and Production Readiness Staircase

Rolls-Royce

Appendices

Supplier PPAP Hand Book

Submission Preparation Guide

Purpose

See associated document titled Submission Preparation Guide. For use by the PPAP Co-ordinator prior to customer submission (or for internal review: see monitor progress), this guide provides a series of structured questions to ascertain if the developed (or developing) PPAP File/Customer Submission, has sufficient content and quality in relation to the PPAP Elements.

This is an aid to existing knowledge and not a definition of the specific requirements involved with these PPAP Elements and the full set of guides can be found on the Supplier Portal.

Table 6: Example of PPAP Submission Preparation Guide

8. Test / Inspection Criteria and Planning

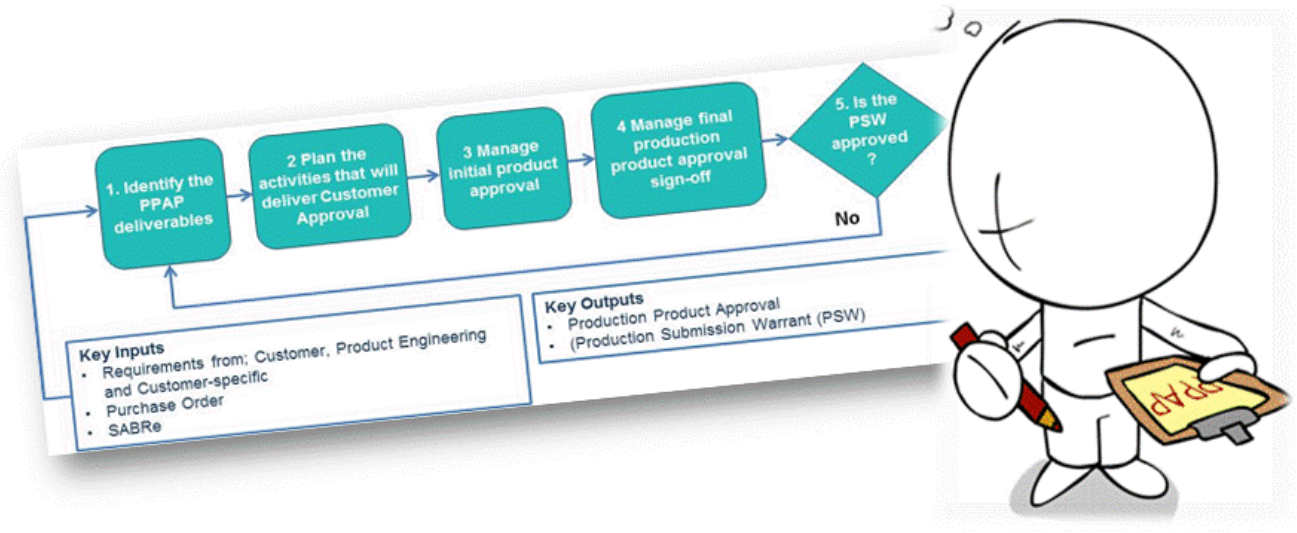
	YES	NO
Do the test inspection criteria verify all product characteristics? I.e. Inclusive of all characteristics specified on drawing, engineering specification associated with this product.		
Has the Test Inspection Criteria been verified against RR requirements?		
Are product references aligned to the customer submission? I.e.: Part number, facility references etc.		

Supplier PPAP Hand Book

PPAP Scenario

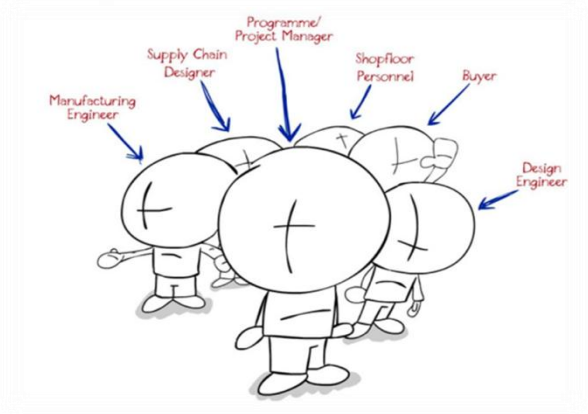
Purpose

The following scenario has been written to help you understand the key concepts and tasks related to SABRe PPAP, it is only intended as an aid and follows the description of a proposed procedure provided by the section title PPAP Management.

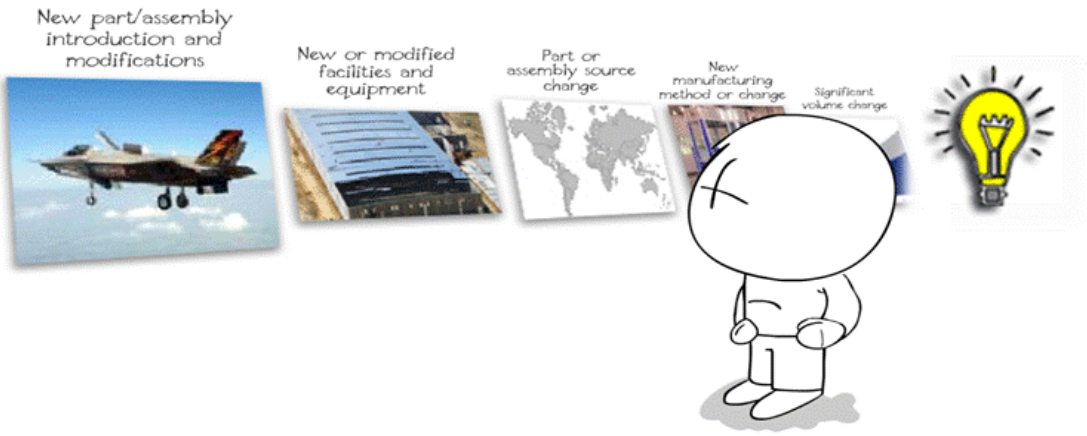


PPAP Scenario

Introduction:



There are two key roles in PPAP: Rolls-Royce Technical Authority (referred to within Rolls-Royce as the CARe [Customer Authorised Representative) and PPAP Co-ordinator. The people in these roles need to work together with cross-functional teams for a successful PPAP outcome. The Rolls-Royce Technical Authority represents the customer and the PPAP co-ordinator represents the supplier.



Background:

The situation is that a new product design is to be created as part of Rolls-Royce's programme called First Launch. The Rolls-Royce Technical Authority for this product is Jack Care, the submission level has been set as SL5 and submission is required within 21 week's time.

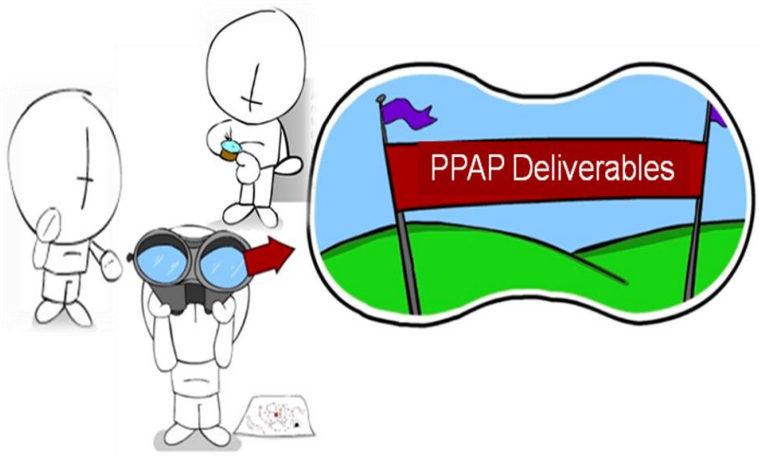
For programme "First Launch", the consistency of the manufactured weight of the product is very important so this is added to the "customer specific requirements". Therefore this becomes an extra approval requirement and along with the other standard requirements for approval (PPAP Element 18: Customer-specific Requirement).

The supplier for the product is "Make Plenty".

Identify the PPAP Deliverables

"Make Plenty" start PPAP by getting the cross-functional team together who are managing the product launch for NPI. From their experience of PPAP they have a number of individuals who could act as PPAP Co-ordinators. The team takes account of what is required in this situation and who has the right skills and experiences.

Fred Champion is identified as the PPAP Co-ordinator for this product.



What is required to obtain production product approval is considered and Fred Champion identifies a potential problem when considering the PPAP Deliverables.

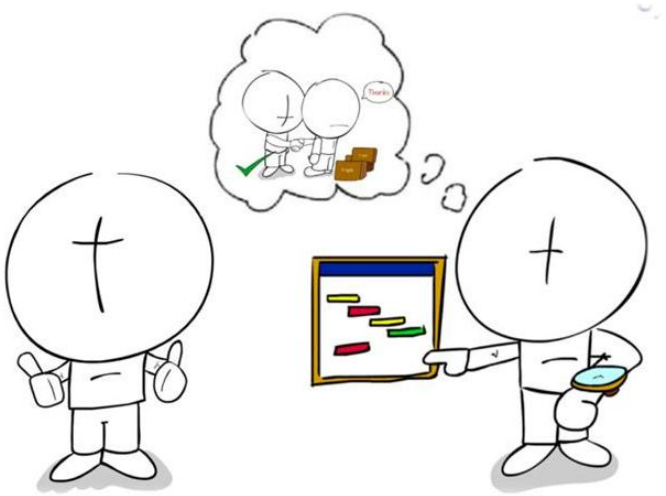
From understanding the delivery plan, making 25 products during the production process run will be difficult given the long lead-time for one of the products used in the finished item. After discussion with Jack Care and Jack's consideration of what is and is not permissible, they agree that 20 products would be achievable given the circumstances.

Information and data are important factors to ensure all elements of PPAP are met. Therefore, Fred Champion proactively initiates a PPAP File because he knows that it will help him keep track of progress throughout the project.

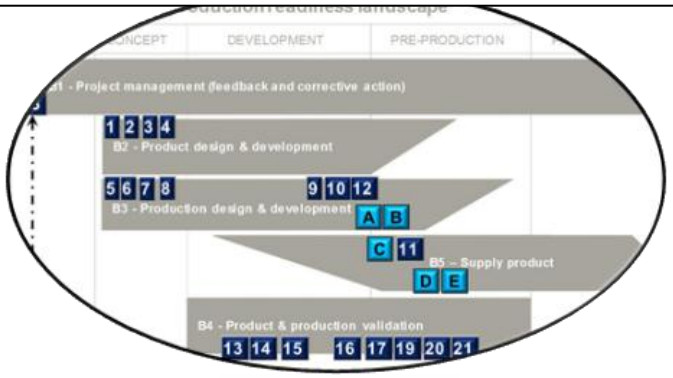
PPAP Scenario

Plan the Activities that will Deliver Customer Approval

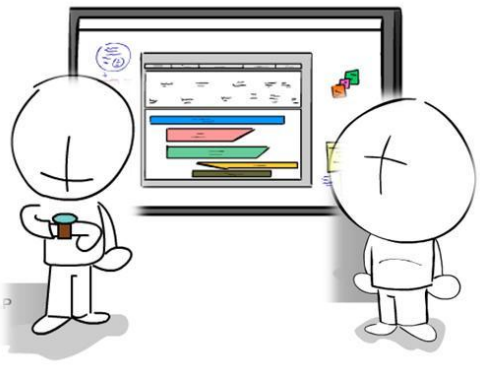
Fred Champion and the team know that the success of working PPAP is through integrating the PPAP tasks and deliverables into the master plan for launching this product. They work together to build these into this master plan.



By doing this, critical timing points are understood, key milestones are recorded on the plan and they are shared within their business (e.g. production process run start and finish dates, the date for customer submission, etc).

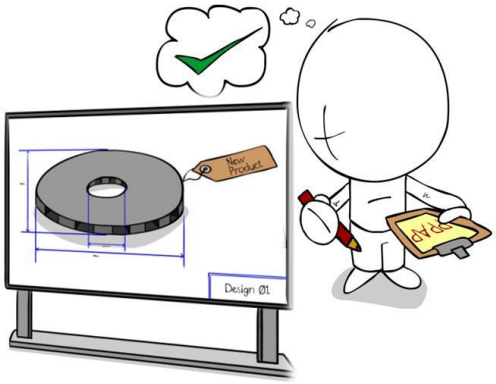


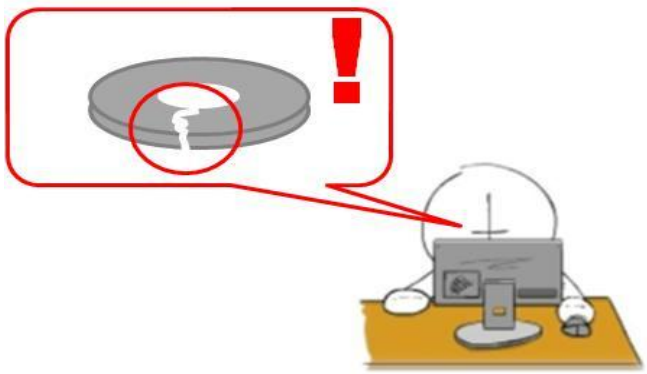
Fred Champion also informs Jack Care of the key milestones and other useful information. As the tasks and activities take place and data is generated, the PPAP File continues to be updated with this information.



As this is a SL 5, Jack Care's take particular interest in how this plan is progressing and being managed for this product. Jack Care sets-up a review calendar with Fred Champion. Included are agenda items that consider the progress of the whole master plan with attention to what will deliver a successful PPAP outcome and on related issues/risks to achieving a right first time customer submission.

Manage Initial Product Approvals





To obtain approval for this product type the master plan has identified the need to carry out some design engineering approval activities that:

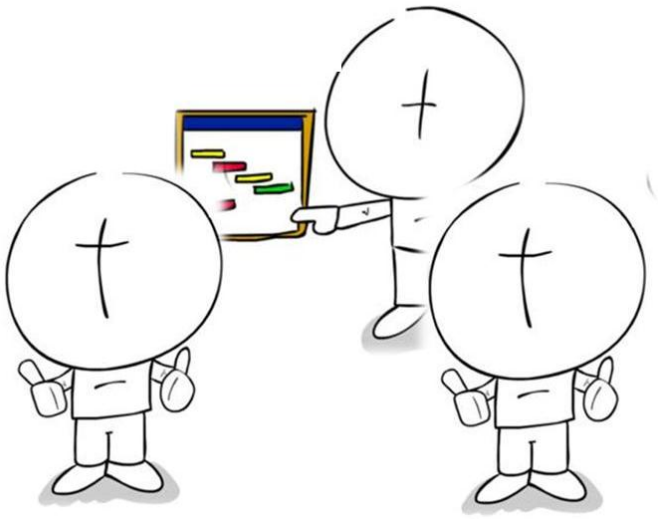
- Confirm that the product complies with the drawing requirements
- Verify the design functional requirements are achieved.

These product-engineering activities take place concurrently with the activities driven by “manage production product approval sign-off”.

The team noted early on that some of these activities need authorisations in advance of the PPAP customer submission, consequently Fred and the team make this happen.

PPAP Scenario

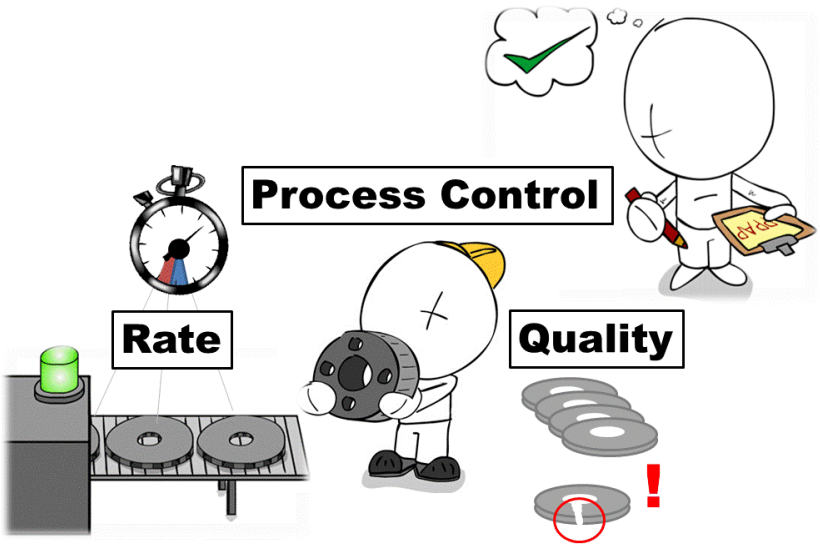
Manage Production Product Approval Sign-off



The date of the production process run is getting close. Fred Champion gets the team together to ensure that everybody knows what needs to take place and they are all ready. The team is happy with progressing as all the necessary preparation tasks are completed.

It is the big day; Fred meets Jack Care at the reception with a smile on his face as he is keen to show off the hard work that the team have been carrying out.

Jack CARe is involved as he will be completing the Customer Witness event as part of the SL 5 requirements and through consultation with Fred Champion, as they have determined that this is the best time to do this.

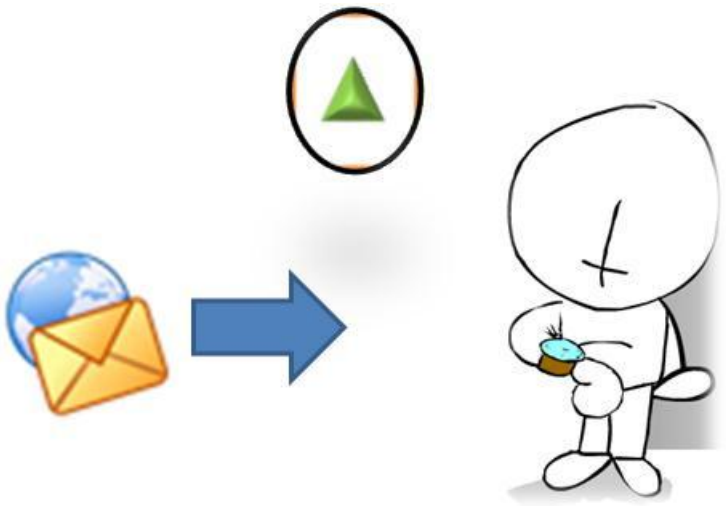


The production process run starts, data is collected and Fred Champion carries out the Process Control Surveillance (PSC) to confirm a number of important factors about the process. In this case, Jack Care also carries out an independent PSC, along with checking that key pieces of PPAP information are within the PPAP File. Jack and Fred share notes and Jack Care departs; leaving Fred Champion and the team to continue with the Production Process Run, which continues until all the 20 products have been made.

The team get together to evaluate the results and information captured during the Production Process Run.

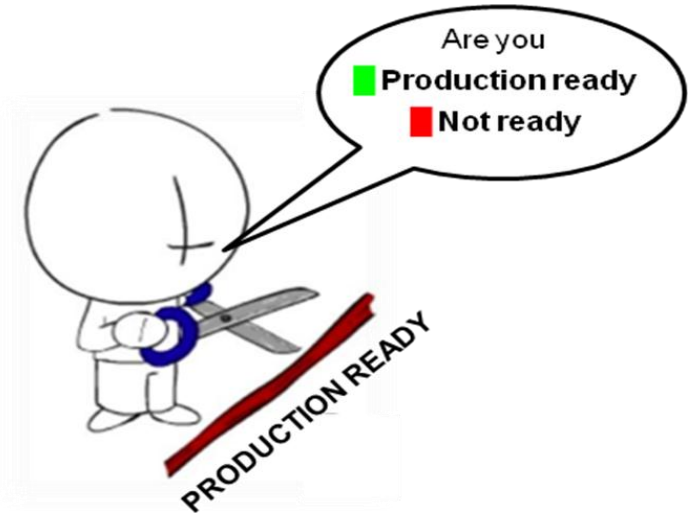
Fred Champion, as the PPAP Co-ordinator knows that he is accountable for the quality of PPAP and the customer submission on behalf of his business.

With the team he leads an in-depth review of the PPAP File, Process Control Surveillance and production process run results. After being convinced that the status is good, the customer submission is prepared; and it includes the formal declaration of satisfaction by using the Production Submission Warrant (PSW). Fred Champion gives the thumbs up to the team and the customer submission is dispatched, marked: For the attention of Jack Care, Rolls-Royce Plc.



PPAP Scenario

Is the PSW approved?

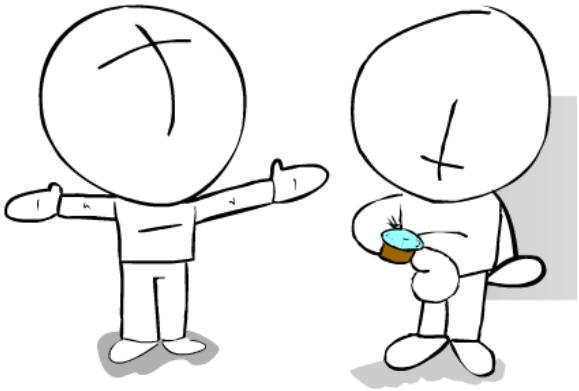


The customer submission arrives for Jack's attention. Carefully Jack Care works his way through the customer submission. Jack Care knows his responsibility in this approval task and with great care reviews the content, reflecting on his notes from the Customer Witness event carried out previously.

His judgement is that:

- ✓ Product quality is **OK**,
- ✓ Production rate potential is **OK**,

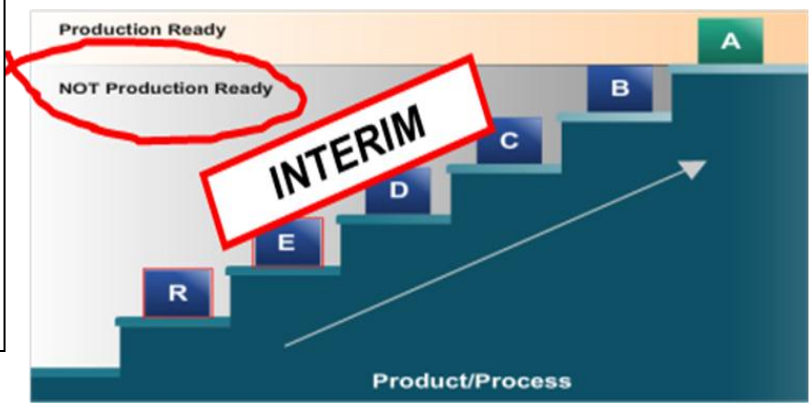
However, not all the PPAP requirements have been satisfied! ✘



Fred Champion and the team have left out one piece of evidence from the submission.

Jack Care talks this through with Fred Champion, Fred Champion commits to a corrective action plan and a re-submission date that is within two weeks.

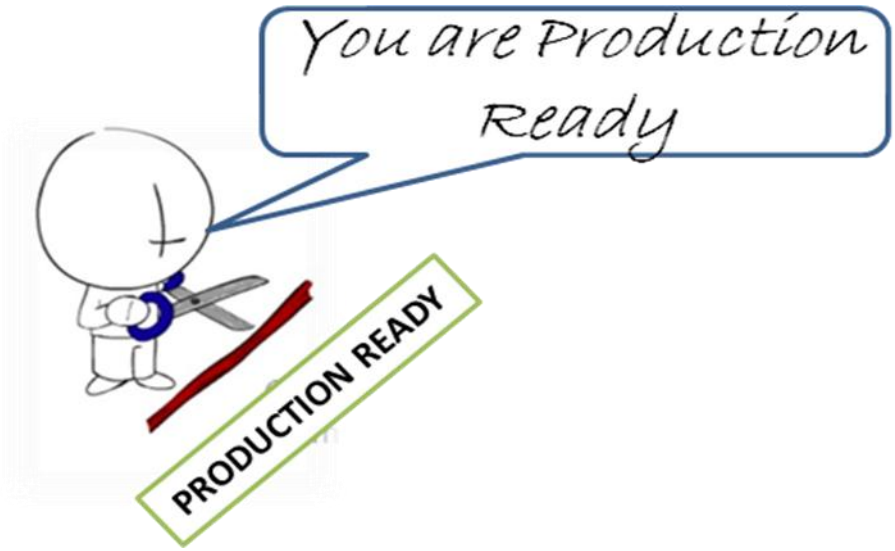
Based on the facts, the situation and risks Jack Care consults his rulebook and concludes the submission is "interim" status and the product can be shipped for the next four deliveries. As the current delivery plan is two deliveries per week.



Fred Champion knows that they need a formal response to their customer submission via the Production Submission Warrant (PSW). Jack marks up the PSW with the relevant information, setting the Production Product Approval classification as “interim”, and informs all stakeholders affected by this decision that delivery is only allowed for four deliveries over the next two weeks.

Fred Champion and the team manage the corrective action plan and they re-submit what is now a complete Customer Submission. Carefully Jack Care reviews the re-submission and concludes that the status is now “approved”. The PSW is updated and Jack Care informs all stakeholders affected by this decision of the “Approved Status”.

Product and process is now regarded as “Production Ready”.



PPAP

Production Product Approval Process

Suppliers Hand Book

Change History			
Revision	Date	Description of Change	Author
0.1	JUNE 2013	First issue	**KARL EVANS** R-R PPAP Programme Manager

Document update policy

This document may be updated periodically. Major amendments will be shown as an update from one revision number to a higher revision number (e.g. revision 1 to revision 2) and therefore the content of the higher revision will be regarded as the latest requirements. A minor amendment will be shown as a number change after a decimal point (e.g. revision 1.1 to revision 1.2) and therefore any of these revisions may be regarded as the latest requirements until a major amendment is introduced