SABRe

Supplier Management System Requirements

Aerospace

Revision 1.0
2nd April 2018

Edition 3

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REVISION SUMMARY/ RATIONALE

SABRe 3 is revised to incorporate the new clause structure and requirements of the following Standards:

- BS/EN/ISO 9001:2015 (Quality Management Systems Requirements)
- AS/EN/JISQ 9100:2016 (Quality Management Systems – Requirements for Aviation, Space and Defense Organisations)
- AS/EN/SJAC 9110:2016 (Quality Management Systems – Requirements for Aviation Maintenance Organisations)

It also directs the application of the following Standards:

- AS13000 (Problem Solving Requirements for Suppliers)
- AS13002 (Requirements for Developing and Qualifying Alternate Inspection Frequency Plans)
- AS13003 (Measurement Systems Analysis Requirements for the Aero Engine Supply Chain)
- AS13004 (Process Failure Mode and Effects Analysis (PFMEA) and Control Plans))
- AS/EN/SJAC 9145:2016 (Requirements for Advanced Product Quality Planning and Production Part Approval Process)
- AS/EN/SJAC 9146:2017 (Foreign Object Damage (FOD) Prevention Programme)
- AS/EN/SJAC 9102 (Aerospace First Article Inspection Requirements)

FOREWORD

SABRe 3 (Supplier Management System Requirements) is the external-facing element of the Rolls-Royce Management System, the purpose of which is to formally communicate specific Rolls-Royce requirements and expectations to the external supply chain.

The latest version along with all relevant supporting material, including forms and templates are available to view and download from the Rolls-Royce Global Supplier Portal (GSP) at https://suppliers.rolls-royce.com.

The external provider, hereafter referred to as Supplier, shall demonstrate compliance with the minimum standard of Business behaviours, Health, Safety and Environmental practices, applicable laws and regulations and act in a way that is ethical and corporately responsible as specified in the Rolls-Royce Supplier Code of Conduct which is available to view and download from the Rolls-Royce Global Supplier Portal (GSP).

Notice To Suppliers (NTS) is the method used by Rolls-Royce to communicate information to the external supply chain. Each NTS is designated a unique number to identify its contents from other documents. All NTS' can be found on the home page of the Global Supplier Portal (GSP). NTS documents should be viewed regularly (at least every 30 days); a record of review and action (if required) shall be maintained.

INTENDED APPLICATION

SABRe 3 is a set of requirements that promotes continuous improvement, defect prevention and the reduction of variation and waste in the Rolls-Royce external supply chain.

INTRODUCTION

The requirements shall support compliance with Rolls-Royce obligations under Aerospace customer contracts and / or aviation authority approvals for design, production, maintenance and operational support activities on aircraft and / or engine components.
When becoming part of a supply chain supporting Defence product and / or services the supplements as contained in AQAP2310 shall apply in addition to the requirements of BS/EN/ISO 9001:2015, AS/EN/JISQ 9100:2016, AS/EN/SJAC 9110:2016.

SABRe 3 consists of 2 sections:

Section 1: General Requirements are based on the structure of and presupposes adherence to BS/EN/ISO 9001:2015, AS/EN/JISQ 9100:2016, AS/EN/SJAC 9110:2016 and is applicable at all times when operating under a Rolls-Royce approval unless otherwise defined in Appendix A.

Section 2: Advanced Product Quality Planning (APQP) and Production Product Approval Process (PPAP) are based upon the structure of and presupposes adherence to AS/EN/SJAC 9145:2016 and AESQ Standards.

Rolls-Royce APQP is applicable unless specifically excluded by the purchase order/contract.

Rolls-Royce PPAP applies to product provided for a project recorded on the PPAP Deployment Matrix as published on the Global Supplier Portal (GSP).

0.1 General

Comply with AS/EN/JISQ 9100:2016 and/or AS/EN/SJAC 9110:2016

0.2 Quality Management Principles

Comply with AS/EN/JISQ 9100:2016 and/or AS/EN/SJAC 9110:2016

0.3 Process Approach

Comply with AS/EN/JISQ 9100:2016 and/or AS/EN/SJAC 9110:2016

0.3.1 General

Comply with AS/EN/JISQ 9100:2016 and/or AS/EN/SJAC 9110:2016

0.3.2 Plan-Do-Check-Act Cycle

Comply with AS/EN/JISQ 9100:2016 and/or AS/EN/SJAC 9110:2016

0.3.3 Risk Based Thinking

Comply with AS/EN/JISQ 9100:2016 and/or AS/EN/SJAC 9110:2016

0.4 Relationship with Other Management System Standards

Comply with AS/EN/JISQ 9100:2016 and/or AS/EN/SJAC 9110:2016

SECTION 1 – QUALITY MANAGEMENT SYSTEMS REQUIREMENTS

1 SCOPE

Comply with AS/EN/JISQ 9100:2016 and/or AS/EN/SJAC 9110:2016

SABRe 3 is applicable to all Suppliers who supply products and/ or services related to Rolls-Royce Aerospace purchase orders / contracts.
SABRe 3 details specific requirements and expectations of Rolls-Royce in addition to those that are already contained in the stated international standards.

Section 1 is applicable at all times when operating under a Rolls-Royce approval.
Suppliers shall ensure that the requirements set out within this document are cascaded to all levels of the supply chain, and validate that the contractual requirements have been met in all tiers.

2 NORMATIVE REFERENCES

Comply with AS/EN/JISQ 9100:2016 and/or AS/EN/SJAC 9110:2016

3 TERMS AND DEFINITIONS

Comply with AS/EN/JISQ 9100:2016 and/or AS/EN/SJAC 9110:2016

Refer to SABRe definitions for additional information. This document is available to view and download from the Rolls-Royce Global Supplier Portal (GSP).

4 CONTEXT OF THE ORGANISATION

4.1 Understanding the Organisation and its Context

Comply with AS/EN/JISQ 9100:2016 and/or AS/EN/SJAC 9110:2016

4.2 Understanding the Needs and Expectations of Interested Parties

Comply with AS/EN/JISQ 9100:2016 and/or AS/EN/SJAC 9110:2016

4.3 Determining the Scope of the Quality Management System

Comply with AS/EN/JISQ 9100:2016 and/or AS/EN/SJAC 9110:2016

Supplemental Requirements
Suppliers shall:

a) At all times comply with the requirements of the Rolls-Royce Supplier Code of Conduct and with other relevant Rolls-Royce codes of practice as set out on the Rolls-Royce Global Supplier Portal (GSP), as amended or replaced from time to time by Rolls-Royce including its standard security and Health and Safety requirements.
b) Hold a Rolls-Royce and / or Third Party approval appropriate to their type and level of supply as stipulated in Appendix A. The Supplier shall notify Rolls-Royce should the approval be suspended or revoked or when major Non Conformities (NCRs) are raised by the Certifying Body.
c) Establish a documented Quality Management System (QMS) that is independently assessed and certified by a Certification Body. The Certification Body must be accredited by a recognised national Accreditation Body to provide audit and certification of Quality Management Systems.
d) Conduct an annual SABRe 3 self-assessment as detailed on the Global Supplier Portal (GSP) and ensure full compliance to all requirements. The results shall be made available to Rolls-Royce on request.

4.4 Quality Management System and its Processes

Comply with AS/EN/JISQ 9100:2016 and/or AS/EN/SJAC 9110:2016

5 LEADERSHIP

5.1 Leadership and Commitment

5.1.1 General

Comply with AS/EN/JISQ 9100:2016 and/or AS/EN/SJAC 9110:2016

5.1.2 Customer Focus

Comply with AS/EN/JISQ 9100:2016 and/or AS/EN/SJAC 9110:2016

5.2 Policy

5.2.1 Establishing the Quality Policy

Comply with AS/EN/JISQ 9100:2016 and/or AS/EN/SJAC 9110:2016

5.2.2 Communicating the Quality Policy

Comply with AS/EN/JISQ 9100:2016 and/or AS/EN/SJAC 9110:2016

5.2.3 Establishing and Communicating the Safety Policy

Comply with AS/EN/SJAC 9110:2016

5.3 Organisational Roles, Responsibilities and Authorities

Comply with AS/EN/JISQ 9100:2016 and/or AS/EN/SJAC 9110:2016

Supplemental Requirements
Suppliers shall:

a) Resource the organisation sufficiently to fully comply with these requirements and confirm and maintain compliance throughout the sub-tiers.
b) Define the personnel accountable for design tasks (Engineering), sub-tier Suppliers control and product quality (across all production shifts) and ensure that they have the authority to stop production and design related deliverables to correct quality problems as they arise.
c) Establish a procedure for task and shift handovers that ensures that all necessary information is communicated (verbally and in written form) between the out-going and in-coming personnel.
d) Establish a procedure to escalate issues and associated risks, including a reporting mechanism for product or design escapes if product or design has been released to Rolls-Royce or any customer.

5.3.1 Accountable Manager

Comply with AS/EN/SJAC 9110:2016

5.3.2 Quality Manager

Comply with AS/EN/SJAC 9110:2016

5.3.3 Other Appointed Manager(s)

Comply with AS/EN/SJAC 9110:2016

6 PLANNING

6.1 Actions to Address Risks and Opportunities

Comply with AS/EN/JISQ 9100:2016 and/or AS/EN/SJAC 9110:2016

Supplemental Requirements
Suppliers shall:

a) Implement a risk management process, such as ISO 31000, across their organisation and put in place appropriate governance such that they:
   - Carry out a robust assessment of the risks, in particular those that could threaten their future performance or solvency, and detail these in a risk register
   - At least annually, carry out a review of the effectiveness of their risk management system (including internal controls)
   - Ensure appropriate assurance is in place to ensure that risk treatments (including internal controls) are proportionate and effective

b) Ensure appropriate treatment activities are in place to mitigate key risks to an acceptable level, including but not limited to:
   - Product safety
   - Shortages of key skills and people
   - Product quality issues (including counterfeit parts)
   - Financial risks
   - Compliance risks (including Health, Safety & Environment, Legal, Export Control and Anti-Bribery and Corruption)
   - Protection of Intellectual Property

c) Identify, assess, mitigate and prevent risk in manufacturing process through the application of Process Flow Diagrams (PFDs), Process Failure Mode and Effects Analysis (PFMEA) and Control Plans in accordance with AS13004.

d) Plan, implement and control a process for managing operational risks including the following as a minimum:
   - Risk identification – identify sources of risk, their cause and effects and their potential business impact
   - Risk analysis – consider the likelihood and level of impact of the identified risks
   - Risk evaluation – compare the level of risk found during the analysis process and prioritise risks treatment
   - Risk treatment – prepare contingency and / or mitigation plans to reduce risk levels
   - Monitoring and review of the risk management activities to ensure controls are effective

e) Establish robust crisis management and business continuity plans that ensure the organisation can continue to operate in the event of a serious incident and is able to recover to an operational state within a reasonably short period. It is recommended these plans include:
   - The identification, analysis, evaluation and / or mitigation of risks related to business continuity that includes (but is not limited to) the following:
     - Product/service, facility or individual skill uniqueness
     - Single points of failure (including sub-tier Suppliers) or key processes
     - The loss of key data or Information Technology (IT) systems
     - Disruption due to fire, explosion or natural disaster
     - Disruption to the supply chain

- Access to alternative development tools and facilities
- Remote backup and archive of data
- Access to alternative IT systems
- Action plans and timescales for business recovery
- Contacts, process owners and procedures to follow in the event of an emergency
- A strategy to control, review periodically and communicate plans to all relevant personnel
- Disaster recovery and contingency planning for storage of data related to the product/service

f) Immediately inform their Rolls-Royce Purchasing contact regarding the following:
- Major incidents affecting the Supplier
- Risks that could impact the continuity of the Supplier's business / operations, particularly single points of failure
- Changes to third party or other party certification including, lapse / withdrawal / major audit findings
- Change of the nominated Quality Representative
- Significant change to the Quality Management System
- Change in ownership or discontinuation of business activities
- Breaches of IT Security systems (Cyber Security)
- Risks with the supply of substances used in the production or physical make-up of products, due to laws and regulations concerning the control or use of such substances that may be published from time-to-time

g) Ensure that chemical substances constituting or contained in products supplied to Rolls-Royce are not restricted under any applicable Chemical Legislation.

h) Provide sufficient information / data as to enable Rolls-Royce to comply with its own obligations under applicable Legislation related to the use of chemicals, including that associated with hazardous materials in products.

i) The Supplier shall consider the elimination of materials and chemical substances from products and processes as applicable according to the requirements of the Rolls-Royce Global Substance Elimination Policy, MLC132.

j) Comply with the requirements so as to ensure continuity of supply when the Supplier has an obligation under any applicable Chemical Legislation.

k) Ensure that data related to the use of substances and mixtures that has been provided to the Supplier by Rolls-Royce is passed onto sub-tier / subcontract suppliers (when applicable).

l) Maintain records of risk management in accordance with Appendix B and submit risk register and business continuity plans to Rolls-Royce on request.

6.2 Quality Objectives and Planning to Achieve Them

Comply with AS/EN/JISQ 9100:2016 and/or AS/EN/SJAC 9110:2016

6.3 Planning of Changes

Comply with AS/EN/JISQ 9100:2016 and/or AS/EN/SJAC 9110:2016

7 SUPPORT

7.1 Resources

7.1.1 General

Comply with AS/EN/JISQ 9100:2016 and/or AS/EN/SJAC 9110:2016

7.1.2 People

Comply with AS/EN/JISQ 9100:2016 and/or AS/EN/SJAC 9110:2016

7.1.3 Infrastructure

Comply with AS/EN/JISQ 9100:2016 and/or AS/EN/SJAC 9110:2016

Supplemental Requirements
Suppliers shall:

a) Identify key process equipment and provide resources and capacity for machine / equipment and tooling maintenance. Develop and execute an effective maintenance system[1].
b) Use a multi-disciplined team to develop robust project plans when implementing new plant, facilities or equipment.
c) Assess production feasibility to ensure that product can be produced in accordance with the standards, specifications and tolerances specified by Rolls-Royce or relevant industry standards.
d) Refer to sections 6 and 8, when planning, developing and implementing new technology with respect to opportunities for new manufacturing technologies and the design and development of products and services.

NOTE 1: A maintenance system can include: planned maintenance activities; identification and provision of critical spare parts; identification and control of all safety-critical plant and equipment; the use of equipment performance metrics and objectives; the use of predictive maintenance or other relevant techniques to improve equipment performance to meet objectives.

7.1.4 Environment for the Operation of Processes

Comply with AS/EN/JISQ 9100:2016 and/or AS/EN/SJAC 9110:2016

7.1.5 Monitoring and Measuring Resources

Comply with AS/EN/JISQ 9100:2016 and/or AS/EN/SJAC 9110:2016

Supplemental Requirements
Suppliers shall:

a) Ensure that monitoring and measurement resources are acceptable by performing Measurement Systems Analysis (MSA) in accordance with AS13003.
b) Ensure all critical and significant characteristics, as defined in AS13003 as ‘critical’ and ‘major’, have MSA studies performed on them. MSA requirements on unclassified characteristics, as defined in AS13003 as ‘minor’, shall be evaluated and agreed with their Rolls-Royce Technical Authority.
c) Ensure that automated measurement system inspection programmes are independently verified and programmers are independent to those who create production programmes. Programmes shall be independent, equipment doesn’t need to be.
d) Ensure that monitoring / measuring equipment used for the final verification / inspection of product is independent to those used for product measurement during production activities or will be re-calibrated / verified prior to use where independence cannot be achieved.
e) Ensure that the personnel nominated to perform product verification activities are trained and competent in the use of the monitoring / measuring equipment.
f) Ensure instructions given to operators and inspectors use the same units of measurement as used on the process and inspection equipment. If conversion of measurement units is required it shall be done by the Suppliers Technical Authority and formally issued.
g) Check monitoring / measuring equipment against a calibrated reference of known size and form at planned intervals between calibration events.
h) Perform a review of measurement capability when tolerances, personnel or environmental conditions have changed.

7.1.6 Organisational Knowledge

Comply with AS/EN/JISQ 9100:2016 and/or AS/EN/SJAC 9110:2016

7.2 Competence

Comply with AS/EN/JISQ 9100:2016 and/or AS/EN/SJAC 9110:2016

Supplemental Requirements
Suppliers shall:

a) Establish a business skills matrix to identify key areas for succession planning.

7.3 Awareness

Comply with AS/EN/JISQ 9100:2016 and/or AS/EN/SJAC 9110:2016

7.4 Communication

Comply with AS/EN/JISQ 9100:2016 and/or AS/EN/SJAC 9110:2016

7.5 Documented information

7.5.1 General

Comply with AS/EN/JISQ 9100:2016 and/or AS/EN/SJAC 9110:2016

7.5.2 Creating and Updating

Comply with AS/EN/JISQ 9100:2016 and/or AS/EN/SJAC 9110:2016

7.5.3 Control of Documented Information

Comply with AS/EN/JISQ 9100:2016 and/or AS/EN/SJAC 9110:2016

Rolls-Royce documents are available to view and download from the Rolls-Royce Global Supplier Portal (GSP)**.**

Supplemental Requirements
Suppliers shall:

a) Comply with the current revision of documents / specifications at the date of product launch and any further revisions thereafter.
b) Comply with the export control policy as published on the Rolls-Royce Global Supplier Portal (GSP).
c) Flow down Rolls-Royce documents / specifications to sub-tier Suppliers (when applicable).
d) Ensure that the translation of Rolls-Royce documents into a Suppliers' national language is performed by a competent translator prior to use[1].
e) Ensure that all technology is managed in accordance with applicable export control legislation including the flow down of such requirements to subcontractors and sub-tier suppliers.
f) Control records related to Rolls-Royce product and / or services in a manner that will allow the timely recovery of a readable version of any records (including electronic records) by ensuring that:
   - Records are retrievable on request within 24 hours
   - Documents / records requiring authorisation by Rolls-Royce are written in English or dual language (i.e. the Suppliers national language plus an accurate English translation made from the original document / record)
g) Ensure that hand-written amendments to records are dated and signed in ink, with the original information being legible after the change.
h) Ensure that characteristic and acceptance test data values are recorded in an electronic format that allows ease of data analysis (e.g. in the form of a spreadsheet).
i) Retain documents and records in accordance with the specified periods in Appendix B.
j) Ensure on-site data access to those Aviation Authorities having jurisdiction over Rolls-Royce sites.

NOTE 1: If an audit is carried out i.e. NADCAP, AS9100 etc. then the Supplier should ensure that an appropriate interpreter is available to translate any other Supplier documentation as necessary.

8 OPERATION

8.1 Operational Planning and Control

Comply with AS/EN/JISQ 9100:2016 and/or AS/EN/SJAC 9110:2016

Supplemental Requirements
Suppliers shall:

a) Plan and schedule product and / or services in order to meet Rolls-Royce requirements.
b) Ensure that production planning / scheduling includes (but is not limited to) the following:
   - Sales and operation planning
   - Master production schedule
   - Material requirements planning
   - Control of purchasing activities
   - Control of production activities
c) Establish a process to plan[1] and manage production capacity that includes (but is not limited to) the following:
   - Availability of resources for labour and equipment

- The impact of new product introduction / product introduction on available capacity

d) Resolve discrepancies between the available capacity and the demands of Rolls-Royce.
e) Monitor the effectiveness of labour, equipment and processes to ensure planning assumptions are accurate.
f) Communicate (flow down) production schedule information to subcontractors / sub-tier Suppliers.
g) Review and respond to Rolls-Royce supply chain future schedules through the process portal (e.g. CEVA matrix).
h) Respond to Rolls-Royce Sales and Operations Review Board (SORB).

NOTE 1: Plans shall be profiled in month for a 2 year time period.

NOTE: APQP provides a method for operational planning and control when conducting activities such as New Product Introduction / Product Introduction (Reference SABRe Section 2).

8.1.1 Operational Risk Management

Comply with AS/EN/JISQ 9100:2016 and/or AS/EN/SJAC 9110:2016

8.1.2 Configuration Management

Comply with AS/EN/JISQ 9100:2016 and/or AS/EN/SJAC 9110:2016

8.1.3 Product Safety

Comply with AS/EN/JISQ 9100:2016 and/or AS/EN/SJAC 9110:2016

Supplemental Requirements
Suppliers shall:

a) Plan, implement, and control the processes needed to assure product safety, as appropriate to the organisation.
b) These processes include:
    - Hazard identification, including reactive and proactive methods
    - Analysis, assessment, and control of safety risks associated with identified hazards
    - Identification and management of changes that may impact product safety
    - Assessment of the effectiveness of safety management processes
    - Provision of training on product safety responsibilities to relevant personnel
    - Communication of product safety information, including safety-critical information, safety events, and changes to safety procedures, as applicable
    - Reporting of safety events to the customer, authorities, and Type Certificate holder in accordance with Customer and Regulatory requirements
c) Notify the Rolls-Royce Purchasing contact within 24 hours of any potential unsafe condition.
d) Retain documented information determined as being necessary for the effectiveness of product safety management.

8.1.4 Prevention of Counterfeit Parts

Comply with AS/EN/JISQ 9100:2016 and/or AS/EN/SJAC 9110:2016

Supplemental Requirements
Suppliers shall:

a) Document a counterfeit parts prevention process and ensure it includes a mechanism for reporting counterfeit and/or suspected counterfeit parts to the Rolls-Royce Purchasing contact as soon as possible but not later than within 24 hours of discovery.

8.1.5 Prevention of Suspected Unapproved Parts

Comply with AS/EN/SJAC 9110:2016

8.1.6 Installation of Approved Parts

Comply with AS/EN/SJAC 9110:2016

8.2 Requirements for Products and Services

8.2.1 Customer Communication

Comply with AS/EN/JISQ 9100:2016 and/or AS/EN/SJAC 9110:2016

8.2.2 Determining the Requirements for Products and Services

Comply with AS/EN/JISQ 9100:2016 and/or AS/EN/SJAC 9110:2016

8.2.3 Review of the Requirements for Products and Services

Comply with AS/EN/JISQ 9100:2016 and/or AS/EN/SJAC 9110:2016

Supplemental Requirements
Suppliers shall:
a) Review the requirements related to the design of the product, the product itself and the purchase order / contract, prior to committing to supply the product / design or acceptance of orders/contracts.

8.2.4 Changes to Requirements for Products and Services

Comply with AS/EN/JISQ 9100:2016 and/or AS/EN/SJAC 9110:2016

8.3 Design and Development of Products and Services

8.3.1 General

Comply with AS/EN/JISQ 9100:2016 and/or AS/EN/SJAC 9110:2016

Supplemental Requirements
Suppliers shall:
a) Ensure compliance with RRES 90009 (Requirements for Design & Development Activities).
b) Ensure compliance with RRES 90059 (Tool and Fixture Design for Suppliers).

8.3.2 Design and Development Planning

Comply with AS/EN/JISQ 9100:2016 and/or AS/EN/SJAC 9110:2016

See 8.3.1 Supplemental Requirements

8.3.3 Design and Development Inputs

Comply with AS/EN/JISQ 9100:2016 and/or AS/EN/SJAC 9110:2016

See 8.3.1 Supplemental Requirements

8.3.4 Design and Development Controls

Comply with AS/EN/JISQ 9100:2016 and/or AS/EN/SJAC 9110:2016

See 8.3.1 Supplemental Requirements
NOTE: The above requirements may be applicable to the development of new technologies to meet customer requirements for new or existing products or services

NOTE: Where required, a technology maturity development process shall be used.

8.3.5 Design and Development Outputs

Comply with AS/EN/JISQ 9100:2016 and/or AS/EN/SJAC 9110:2016

See 8.3.1 Supplemental Requirements

8.3.6 Design and Development Changes

Comply with AS/EN/JISQ 9100:2016 and/or AS/EN/SJAC 9110:2016

Supplemental Requirements
Suppliers shall:
a) Complete and submit the form(s) (see forms section of the Global Supplier Portal (GSP)) associated with this activity to their Rolls-Royce Technical Authority.
b) Ensure Design Changes and Definition Alteration Requests (DAR) are authorised by Rolls-Royce before implementation (including verification and validation as appropriate).
c) Ensure that configuration management related to Design Changes and Definition Alteration Requests are controlled.
d) Ensure that revised component definition (e.g. amended drawing) has been issued / released prior to the implementation of any agreed change and before the shipment of product to Rolls-Royce.

8.4 Control of Externally Provided Processes, Products and Services

8.4.1 General

Comply with AS/EN/JISQ 9100:2016 and/or AS/EN/SJAC 9110:2016

Supplemental Requirements
Suppliers shall:
a) Select, manage and monitor key subcontractor / sub-tier Suppliers through the following controls:
    - Assess Suppliers capability prior to placing orders
    - Undertake oversight prioritised based upon risk
    - Evaluate root cause activities where non-conformances occur
    - Measure performance:
        - Delivered product quality
        - Customer disruptions / customer returns
        - Delivery schedule performance
    - Conduct load and capacity reviews with key subcontractor / sub-tier Suppliers annually or following significant load increase
    - Take appropriate containment and corrective action with poorly performing subcontractor / sub-tier Suppliers
    - Enlist adequate and skilled resources to undertake the Suppliers management activities including the management of special processes
b) Only purchase products and services from sources holding appropriate approval as stipulated in Appendix A.
c) Ensure that purchasing information / documentation and requirements for subcontractors / sub-tier Suppliers is flowed down the supply chain (applicable SABRe requirements).
d) Specify the supporting documents with the purchased product or service confirming compliance to specifications.
e) Work within the scope of their QMS and the approvals from Rolls-Royce.
f) Hold a Rolls-Royce and / or Third Party approval appropriate to their type and level of supply as stipulated in Appendix A.
g) Demonstrate through documented evidence that subcontractors / sub-tier Suppliers (including any Direct Buy Vendor) engaged in the manufacture of product are being managed to Rolls-Royce requirements.

8.4.2 Type and Extent of Control

Comply with AS/EN/JISQ 9100:2016 and/or AS/EN/SJAC 9110:2016

8.4.2.1 Work Transfers

Suppliers shall:
a) Complete and submit the form(s) associated with this activity to their Rolls-Royce purchasing contact.
b) Ensure that no change takes place until the Supplier has submitted and received approval to proceed from Rolls-Royce.
c) Ensure that work transfer (source change) documentation / information is communicated along the purchase order cascade.
d) Demonstrate that any export control risks associated with the work transfer have been properly assessed and any changes to, or requirements for new export authorisations have been planned.

8.4.2.2 Verification of Externally Provided Processes and Services

Suppliers shall:

a) Ensure 100% inspection of products from subcontractors / sub-tier Suppliers which do not need approval from Rolls-Royce as defined in Appendix A.

8.4.3 Information for Suppliers

Comply with AS/EN/JISQ 9100:2016 and/or AS/EN/ SJAC 9110:2016

8.5 Production and Service Provision

8.5.1 Control of Production and Service Provision

Comply with AS/EN/JISQ 9100:2016 and/or AS/EN/ SJAC 9110:2016

Supplemental Requirements
Suppliers shall:

a) Create a test / inspection plan for all product characteristics and production operations including:
   - Where in the sequence the testing / inspection operations are performed
   - A reference to each product characteristic to be tested / inspected at each operation
   - The type of equipment required and any specific instructions associated with their use
   - Criteria for acceptance and / or rejection
   - A reference to product test / inspection activities to be witnessed by the customer
   - Control plans for characteristics that are not tested / inspected when the product is in the final condition (inaccessible characteristics, characteristics tested / inspected before the product is in its final condition, characteristics that cannot be measured directly, characteristics subject to sample or reduced inspection)
b) Ensure 100% verification of all product characteristics in their final condition. This is not required for purchased standard catalogue hardware. Sample inspection or reduced inspection shall be applied in accordance with AS13002.
c) Ensure product test / inspection activities are conducted in an acceptable environment. This shall include lighting conditions that provide at least 700 LUX, and where accurate visual inspections are required to be performed, white light intensity of at least 1000 LUX.
d) Record measurement results in accordance with rules defined in the SABRe Brief “Rules on significant figures and rounding”.
e) Produce records of test and inspection, these shall include as a minimum:
   - Item inspected
   - Activity performed
   - Procedure / Instruction for the inspection activity
   - Date of inspection or surveillance activity
   - Personnel who performed the inspection or surveillance
   - Results of the inspection / surveillance
f) Where actual measurement values are routinely recorded during inspection, these shall not be deliberately destroyed, deleted or exposed to hazards detrimental to record retention (e.g. fire or water hazard). This includes features inspected:
   - Using equipment where a report containing actual measurement values is automatically created (e.g. Coordinate Measurement Machines, computer connected digital equipment etc.)
   - Where measurement values are already routinely recorded for other reasons (e.g. Statistical Process Control (SPC), Key Characteristics, etc.)

Suppliers shall:

a) Unless otherwise agreed by Rolls-Royce, perform SPC studies and ongoing monitoring on Key Characteristics (i.e. KCF / CCF) (see Appendix C). Results shall be formally recorded and provided to Rolls-Royce. A Process Control Document (PCD) is provided in AS/EN/SJAC 9103 for this purpose.
b) If the process is not stable or capable, identify and implement improvement activities to address the shortfall and develop containment plan that assures conforming product.
c) Minimum Process Capability requirements are as follows:
   - Cpk ≥ 2.0 for Civil Aerospace New Product Introduction (NPI)
   - Cpk ≥ 1.33 for all other Aerospace products (Civil Aerospace legacy products, Defence, Maintenance Repair and Overhaul (MRO))

NOTE: Processes / characteristics should be ‘on target’ (i.e. centred on the Engineering specified nominal value).

NOTE: Rolls-Royce has a quality commitment to defect free manufacture. Capability of Cpk ≥ 2.0 is desirable for all features (not only Key Characteristics) in order to establish performance levels in line with this commitment.

8.5.1.1 Control of Equipment, Tools and Software Programs

Comply with AS/EN/JISQ 9100:2016 and/or AS/EN/ SJAC 9110:2016

Supplemental Requirements
Suppliers shall:
a) Establish a system for the management of pre-production and production tooling, jigs and fixtures that includes(but is not limited to) the following:

- Unique tool identification
- Validation of tool prior to release for production
- Protection from damage and deterioration during storage
- Maintained as fit for purpose
- Storage and recovery
- Tool set-up
- Tool life control / tool-change programmes
- Tool design modification documentation, including engineering change level
- Tool modification and revision

8.5.1.2 Validation and Control of Special Processes

Comply with AS/EN/JISQ 9100:2016 and/or AS/EN/ SJAC 9110:2016

8.5.1.3 Production Process Verification

Comply with AS/EN/JISQ 9100:2016

Supplemental Requirements
Suppliers shall:

a) Implement the requirements of AS/EN/SJAC 9102.
   - Rolls-Royce requires First Article Inspection (FAIR) to be applied to unique single run production orders, not intended for ongoing production e.g. out-of-production spares
b) Perform FAIR on a single part, measuring all characteristics in the final product.
   - When characteristics measured during the manufacturing process (not accessible in the final product) have potential to be affected by subsequent operations (e.g. welding or heat treatment), the supplier must obtain agreement from the Rolls-Royce Technical Authority on whether additional verification is required
   - When not physically possible to perform FAIR on a single part, measurement results from more than one part may be used, providing all parts are manufactured to the same engineering definition, bill of material, supply chain and production method. The FAIR shall identify all parts used
c) Use capable measurement equipment in accordance AS 13003.
d) Use measurement equipment, inspection personnel and Coordinate Measuring Machine (CMM) programme and programmer that are independent to those used for measurement in the production process.
   - 'Designed Tooling' used to verify characteristics in the production process shall only be used for FAIR when there is no viable alternative and it is re-calibrated and certified prior to its use for FAIR
e) Perform a Last Article Inspection Report (LAIR) when the source of manufacture of a product is planned to change, or at the request of Rolls-Royce.
f) Compile and submit a FAIR / LAIR using the Rolls-Royce e-FAIR tool.
   - When access to the e-FAIR tool is not available, the Form associated with Production Process Verification shall be used and submitted to the company placing the purchase order
g) Only release product into Rolls-Royce against an approved FAIR.

Fixed Production Method applies to all Suppliers when the product definition specifies "Fixed Process Control" to RRES 90000 (Engineering Control of Manufacturing Source & Method).

Suppliers shall:
a) Complete and submit the form(s) associated with this activity to their Rolls-Royce Technical Authority (see forms) along the purchase order cascade for initial approval and approval of any change to source and / or method of production in accordance with the requirements of RRES 90000.

Vision Standards
Suppliers shall:
a) Ensure Non Destructive Testing (NDT) personnel are examined in accordance with the applicable NDT personnel qualification and certification standard, e.g. EN 4179, NAS 410, SNT-TC-1A, ISO 9712. Weld inspectors and personnel performing visual inspection to detect material discontinuities are included in this category.
b) Ensure non-NDT personnel engaged in product verification and inspection activities are examined at three (3) yearly intervals. Eyesight acuity shall be a minimum of Curpax N5, Jaeger #2 or equivalent in at least one eye and when using both eyes together. Colour vision perception shall be examined at five (5) yearly intervals.
c) Ensure welding personnel are examined at annual intervals. Eyesight acuity shall be a minimum of Curpax N5, Jaeger #2 or equivalent for near vision, Snellen 20 / 30 or equivalent for far vision.
d) Ensure Vision tests are performed by suitably trained and qualified personnel. For NDT personnel, this duty shall be performed by individuals designated by the Responsible Level 3 or a qualified medical practitioner.
e) Ensure Vision correcting eyewear, e.g. glasses, contact lenses, etc. used to pass the vision examination are worn when performing product verification/inspection activities. Any changes to vision correcting eyewear will require a re-examination before being used. The use of darkened lenses or those that darken on exposure to light are prohibited.
f) Ensure that where personnel fail, a colour perception examination, their capability to distinguish and differentiate colours used in performance of applicable product verification / inspection activities is determined and documented.

For the appointment of competent persons, including any required qualification
Suppliers shall:
a) Ensure employees directly inspecting product are formally authorised.
b) Ensure product is released by authorised personnel.

8.5.1.4 Evaluation of a New Capability

Comply with AS/EN/SJAC 9110:2016

8.5.2 Identification and Traceability

Comply with AS/EN/JISQ 9100:2016 and/or AS/EN/SJAC 9110:2016

Supplemental Requirements
Suppliers shall:
a) Control the unique and serialised identification of the product when required to do so as specified in the Rolls-Royce product definition (see forms).
b) Accept the release documentation where product is provided by Rolls-Royce. This documentation is sufficient evidence of product traceability up to the point of the release documentation being created. In such cases, it is not necessary to verify test reports and original raw material manufacturer source certificates.

8.5.3 Property Belonging to Customers or Suppliers

Comply with AS/EN/JISQ 9100:2016 and/or AS/EN/SJAC 9110:2016

8.5.4 Preservation

Comply with AS/EN/JISQ 9100:2016 and/or AS/EN/SJAC 9110:2016

Supplemental Requirements
Suppliers shall:
a) Provide secure storage facilities for product, equipment, tools and material.
b) Ensure the conditions of storage prevent deterioration and damage of stored items.
c) Assess the condition of product in stock at appropriate planned intervals in order to detect deterioration.
d) Establish an inventory management procedure that includes (but is not limited to) the following:

- Rule for determining safety stock levels
- Method to guarantee inventory accuracy
- Key performance indicators to monitor inventory
- Method to monitor, review and action slow-moving work in progress
- Control of shelf life product

e) Ensure that access to storage facilities is restricted to authorised personnel.
f) Deliver product using the Rolls-Royce standard delivery transport network and collection service as / when specified by Rolls-Royce (i.e. Manifest or equivalent).
g) Use appropriate transport to ensure that the product is delivered in a timely manner and ensures that the product will be received in a condition that is fit for purpose (i.e. when the Rolls-Royce standard transport network and collection service is not specified or will not/ cannot be used).
h) Ensure that products are packaged to a standard that provides adequate protection against damage, deterioration and tampering during shipment, storage and distribution.
i) Compile a "Packaging and Labelling Data Sheet" (see forms section of the Global Supplier Portal (GSP)) to define the packaging and labelling applied to the product and submit to Rolls-Royce (on request).
j) Comply with the latest version of the Protection Packaging and Labelling document published on the Global Supplier Portal (GSP).
k) Develop and establish a Foreign Object Damage (FOD) prevention program in accordance with AS/EN/SJAC 9146:2017

8.5.5 Post-Delivery Activities

Comply with AS/EN/JISQ 9100:2016 and/or AS/EN/SJAC 9110:2016

8.5.6 Control of Changes

Comply with AS/EN/JISQ 9100:2016 and/or AS/EN/SJAC 9110:2016

8.6 Release of Products and Services

Comply with AS/EN/JISQ 9100:2016 and/or AS/EN/SJAC 9110:2016

Supplemental Requirements
Suppliers shall:
a) Provide separate release documentation with each delivery to Rolls-Royce.
b) Ensure that the release documentation:
- Is written in English or in a language specified by the customer
- Refers to a single purchase order / schedule
- Refers to a single part number
- Is legible and protected from damage/ deterioration
- Is attached to the outside of the secondary packaging
- A copy of the Certificate of Conformity (CoC) is placed on the outside of the secondary packaging and a copy inside the secondary packaging
- Contains the following information as a minimum:
  - Unique traceable document reference number
  - Suppliers' name, address and telephone number
  - Delivery address
  - Rolls-Royce purchase order number (including purchase order item number)
  - Rolls-Royce plant and storage location (when specified)
  - Description of the product (as referenced on the Rolls-Royce purchase order or drawing)
  - Part number (as referenced on the Rolls-Royce purchase order)
  - Kit number (when applicable) – plus a list of part numbers, quantities, serial numbers
  - Traceable reference (serial, batch, lot, heat, cast numbers - as applicable)
  - Quantity
  - Date of despatch
  - Conformance / compliance statement[1]
  - Export Classification of the product under the External providers' national jurisdiction
  - Details of any export authorisation applicable to the product including any conditions or restrictions relating to the use, re-export or re-transfer of the product and its associated technology
  - The name and signature of person authorised to release the product to the customer[2]

c) Provide additional information (when applicable):
- FAIR
- Modification, repair scheme, or service bulletins

- Classification of product
- Approval plan number
- Quality plan number
- Concession / Deviation Permit category and number except Category 3 (referenced concession / Deviation Permit to be provided)
- Hazardous substances / safety data sheet (safety data sheet to be provided)
- Shelf life (cure date, batch, group) – no mixed cure dates / batches
- Virus-free declaration (for computer software)
- Cross reference to the original raw material manufacturer's name (stockists / distributors)
- Cross reference to customer name and purchase order (material processors)

d) Provide a certificate of analysis or raw material manufacturer's certificate with the shipment of raw material that contains the following:
   - Traceable reference to batch, lot, heat, cast numbers
   - Chemical analysis including constituent elements and percentages
   - Physical analysis (i.e. stress strain data, and temper)

e) Provide an authorised release certificate if applicable and requested.
f) Only release product into Rolls-Royce against an approved FAIR (when applicable).
g) Retain documented information[3] of release documentation in accordance with Appendix B.

NOTE 1: Typical compliance statement: "Certified that the whole of supplies hereon have been inspected / tested and unless otherwise stated, conform in all respects to specification, drawing and purchase order requirements".

NOTE 2: Electronically signed release documentation is acceptable, subject to prior approval from the Rolls-Royce Technical Authority.

NOTE 3: Retained documented information of release documentation held electronically shall contain all of the information shown on the original document and a traceable reference to the person authorised to release the product to customer.

8.7 Control of Nonconforming Outputs

Suppliers shall:
a) Establish a method of detection and feedback of product nonconformities or process noncompliance.
b) Take necessary actions to fully contain problems within 48 hours.
c) Immediately notify their Rolls-Royce purchasing contact and their Rolls-Royce Technical Authority (or other impacted customers) of any delivered nonconforming product and confirm that the notification has been received by Rolls-Royce.
d) Segregate any undelivered nonconforming product and hold until a response related to the disposal of the product has been received from Rolls-Royce.
e) Stop shipment of product when notified of non-conformance by Rolls-Royce until appropriate corrective action has been established.

NOTE: Where Product nonconformities are identified by Rolls-Royce, an associated cost of non-quality charge as published on the Global Supplier Portal (GSP) may apply.

8.7.1 Nonconforming Outputs

Comply with AS/EN/JISQ 9100:2016 and/or AS/EN/SJAC 9110:2016

8.7.2 Nonconforming Documented Information

Comply with AS/EN/JISQ 9100:2016 and/or AS/EN/SJAC 9110:2016

8.7.3 Deviation Permits and Concessions

Requests for concession applications will only be accepted under exceptional circumstances and may be subject to cost of non-quality charges as published on the Global Supplier Portal (GSP)**.**

Suppliers shall:
a) Ensure that written authorisation has been granted by their Rolls-Royce purchasing contact prior to the shipment of a product which does not conform to specified requirements.
b) Complete and submit the form(s)[1] associated with this activity to their Rolls-Royce purchasing contact (see forms section of the Global Supplier Portal (GSP)) or through eConcessions (electronic concession system) where access has been granted by Rolls-Royce.
c) Take appropriate corrective action and document it within the concession form and/or deviation permit.

d) Flow the non-conformance documentation along the purchase order cascade.
e) Mark the product as indicated on the deviation permit / concession[2], including (but not limited to) the relevant concession category and concession number allocated by Rolls-Royce in accordance with the applicable identification marking method (and location) specified in the product definition.
f) Attach an orange coloured concession label[2,3] to the primary, secondary and tertiary packaging (as applicable) that states the concession category and concession number allocated by Rolls-Royce.

NOTE 1: Forms related to German defence products shall be written in German.

NOTE 2: For concessions sentenced as category 1, 2 or X only.

NOTE 3: Concession labels are only applicable to Rolls-Royce Aerospace contracts / purchase orders being delivered to Rolls-Royce UK, Rolls-Royce Deutschland and Rolls-Royce Singapore.

8.7.4 Control of Re-worked (in Production) Product

Suppliers shall:
a) Rework product in accordance with controls specified within the process specifications on the product definition or to an agreed rework procedure authorised by Rolls-Royce.
b) Ensure that instructions for rework, including re-verification / inspection requirements are accessible to and utilised by the appropriate personnel.

9 PERFORMANCE EVALUATION

9.1 Monitoring, Measurement, Analysis and Evaluation

9.1.1 General

Comply with AS/EN/JISQ 9100:2016 and/or AS/EN/SJAC 9110:2016

Supplemental Requirements
Suppliers shall:
a) Establish a visual management process that will provide feedback to everyone involved in the process. This should include (but not be limited to) current status, flow of work, priority and the performance of the process so it can be assessed and understood.

9.1.2 Customer Satisfaction

Comply with AS/EN/JISQ 9100:2016 and/or AS/EN/SJAC 9110:2016

Supplemental Requirements
Suppliers shall:
a) Create production process performance metrics that monitor (but are not limited to) the following (unless otherwise agreed):
   - Statistical process control where indicated on Process Failure Mode Effect Analysis (PFMEA) or requested by Rolls Royce
   - Cycle-time and lead-time adherence
   - Process yield rates (% scrap, % rework)
   - Product % Right First Time
b) Monitor performance metrics in accordance with customer expectations / targets (where specified).
c) Feedback performance metrics for process improvement.
d) Use performance metrics to maintain accurate planning parameters.
e) Monitor quality and delivery performance using key performance indicators[1].
f) Ensure 100% quality performance and 100% on-time and in-full delivery performance is achieved and maintained[2].
g) Immediately inform the Rolls-Royce purchasing contact when it is identified that delivery schedules are not (or will not be) achieved. A recovery plan must then be submitted within 24 hours to the Rolls-Royce purchasing contact.
h) Use a cross-functional team to develop and deploy a reactive and preventative continual improvement policy and plans to meet Rolls-Royce performance expectations.

NOTE 1: Where Rolls-Royce has provided the Supplier with a scorecard the Supplier will use the scorecard as a key performance indicator.

NOTE 2: Where performance consistently and / or significantly falls below agreements and / or expectations the Supplier shall be subject to the requirements of the "Red Flag" process, details of which will be communicated separately should these circumstances arise.

9.1.3 Analysis and Evaluation

Comply with AS/EN/JISQ 9100:2016 and/or AS/EN/SJAC 9110:2016

9.2 Internal Audit

Comply with AS/EN/JISQ 9100:2016 and/or AS/EN/SJAC 9110:2016

Supplemental Requirements
Suppliers shall:

a) Establish an annual audit programme (product and production / special process audits) that includes internal engineering, internal production and subcontract activities, to verify compliance to planned arrangements and, where applicable compliance with the signed Engineering Supplier Integration Document (ESID) related to Rolls-Royce contracts. The audit programme shall be created and prioritised based on product and process risk.
b) Conduct cross-functional (e.g. quality, design and manufacturing) product audits at appropriate stages of design and production using a product that has been selected at random from the current production process and covering all significant products to determine the following:
    - Production method provides a record to demonstrate that all operations are complete
    - Verification / inspection records demonstrate that all operations and all features are appropriately verified
    - Dimensional acceptability to product definition
    - Visual acceptability to product definition
    - Functional performance test to product definition (where applicable)
c) Audit each design and manufacturing process to determine if the resources and controls used to transform inputs into outputs are effective and comply with requirements.
d) Use internal auditors who are appropriately trained and competent to perform audits. Auditors used for surveillance of subcontracted activities shall be as minimum trained and competent in quality systems (e.g. AS/EN/JISQ 9100:2016), the relevant technical specifications and SABRe.
e) Establish specific checklists to be used for each audit.
f) Increase audit frequencies when internal / external nonconformities or customer complaints occur.
g) Take immediate action when an audit identifies a product non-conformance.
h) Take appropriate corrective action and implement within 90 days or prior to shipment of product (whichever is sooner).

9.3 Management Review

9.3.1 General

Comply with AS/EN/JISQ 9100:2016 and/or AS/EN/SJAC 9110:2016

9.3.2 Management Review Inputs

Comply with AS/EN/JISQ 9100:2016 and/or AS/EN/SJAC 9110:2016

9.3.3 Management Review Outputs

Comply with AS/EN/JISQ 9100:2016 and/or AS/EN/SJAC 9110:2016

10 Improvement

10.1 General

Comply with AS/EN/JISQ 9100:2016 and/or AS/EN/SJAC 9110:2016

10.2 Nonconformity and Corrective Action

Comply with AS/EN/JISQ 9100:2016 and/or AS/EN/SJAC 9110:2016

Supplemental Requirements
Suppliers shall:

a) Ensure the continuity of supply of conforming product to Rolls-Royce, while all non-conformances are being investigated.
b) Take necessary actions to fully contain problems within 48 hours.
c) Conduct an 8D investigation, in accordance with AS13000 requirements for complex problems, where the root cause is not known or where specifically requested by Rolls-Royce.
d) Align the type of methodology of problem solving, including 8D, to the complexity of the problem with an appropriate level of governance.
e) Analyse and collate non-conformance into themes. These shall then be prioritised using the Pareto principle for improvement through structured problem solving.
f) Upon request of Rolls-Royce, submit the problem solving investigation for any non-conformity within 30 days (unless otherwise stated).
g) Ensure the product PFMEA and the Control Plan are reviewed and updated during and following the implementation and verification of corrective actions for all problem solving activities.
h) Drive improvement plans for prevention of repeat problems (using quality tools e.g. fishbone, 5Y, SPC, Minitab, poke-yoke).
i) Review the effectiveness of the problem solving process at periodic intervals and take appropriate actions to improve (e.g. at Management Review or similar).

10.3 Continual Improvement

Comply with AS/EN/JISQ 9100:2016 and/or AS/EN/SJAC 9110:2016

SECTION 2 – REQUIREMENTS FOR ADVANCED PRODUCT QUALITY PLANNING (APQP) & PRODUCTION PRODUCT APPROVAL PROCESS (PPAP)

0.1 General

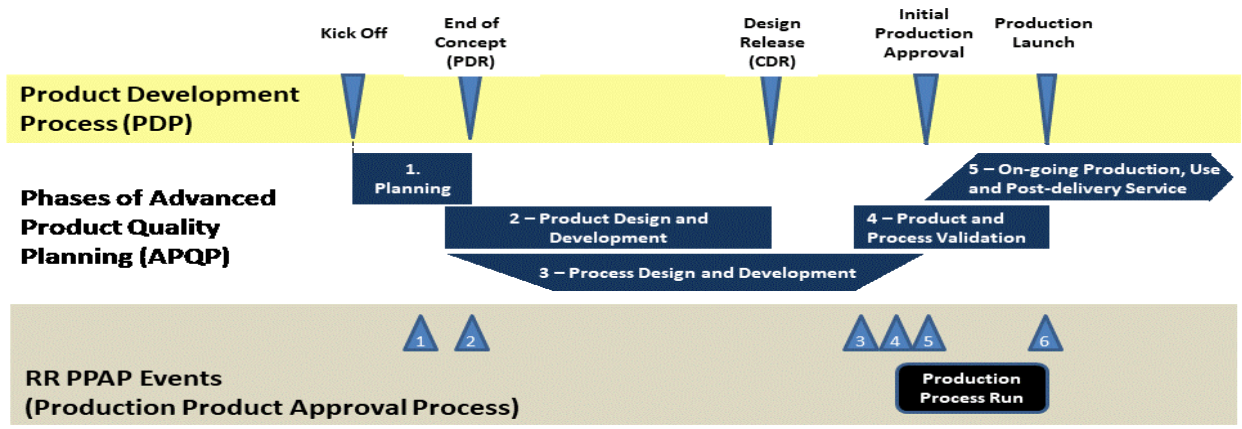
Comply with AS/EN/SJAC 9145:2016

Supplemental Requirements
Suppliers shall:

a) Develop metrics that monitor progress and satisfaction of Rolls-Royce PPAP Events and submission(s), and when requested by Rolls-Royce provide results.

NOTE: The APQP and PPAP Timing Plan (an adaption of the AS9145 Conceptual Illustration) provides the relation between AS9145 Phases of APQP and Rolls-Royce PPAP Events:

APQP and PPAP Timing Plan



Rolls-Royce PPAP Events:

1. Criteria communicated and agreed	4. Started Production Process Run
2. Planned for PPAP	5. FAIR
3. Product Quality Planning satisfactory	6. Customer Submission for Approval

0.2 Application

Comply with AS/EN/SJAC 9145:2016

Rolls-Royce PPAP applies to product provided for projects recorded on the PPAP Deployment Matrix as published on the Global Supplier Portal (GSP).

1 SCOPE

Comply with AS/EN/SJAC 9145:2016

All or some phases of APQP are applicable to a:

- New product design or change to design (Design Make) [1]
- New product design or change to design (Make to Print) [2]
- New or change to production location or source[3] producing the product[4]
- New process or process change[4], unless change is negligible[5]

All sections of PPAP apply unless stated otherwise.

NOTE 1: All phases are applicable
NOTE 2: Phases 1, 3, 4, 5 are applicable and Phase 2 would be limited to feasibility of the proposed design requirements (AS/EN/SJAC 9145:2016, clause 4.4.6) and approval
NOTE 3: The term location would be additional or alternative. The term source would be sub-tier, subcontractor or material source.
NOTE 4: Phases 1, 3, 4 and 5 are applicable.
NOTE 5: Examples of Negligible are; Change that does not have the potential to impact the performance of the process (quality, cycle time), change of tooling that is not Special To Process and an equivalent, change that

does not impact process stages that control or monitor key characteristics, change that does not require a change to inspection / test methods, change that does not introduce additional or alternative processing.

2 REFERENCES

Comply with AS/EN/SJAC 9145:2016

3 TERMS AND DEFINITIONS

Comply with AS/EN/SJAC 9145:2016

4 ADVANCED PRODUCT QUALITY PLANNING (APQP) REQUIREMENTS

Comply with AS/EN/SJAC 9145:2016

4.1 General Requirements

Comply with AS/EN/SJAC 9145:2016

Supplemental Requirements
Suppliers shall:
a) Establish a documented procedure to comply with Rolls-Royce APQP and PPAP requirements
b) Include Rolls-Royce Customer specific requirements within the scope of products for which APQP applies.

4.2 Advanced Product Quality Planning Project Management

Comply with AS/EN/SJAC 9145:2016

Supplemental Requirements
Suppliers shall:
a) Provide on request by Rolls-Royce the plan[1] and results of Monitoring and Reporting.
NOTE 1: Rolls-Royce agreement of the plan may be required.

4.3 Phase 1 Requirements – Planning

Comply with AS/EN/SJAC 9145:2016

Supplemental Requirements
Suppliers shall:
a) Apply APQP Phases 2, 3, and 4, in accordance with the application of Rolls-Royce APQP unless defined otherwise within the Rolls-Royce Customer specific requirements.

4.4 Phase 2 Requirements – Product Design and Development

Comply with AS/EN/SJAC 9145:2016

Supplemental Requirements
Suppliers shall:
a) Apply Design Failure Mode and Effects Analysis (DFMEA)[1] as the Design Risk analysis method.
b) Document the feasibility of the proposed design using the Rolls-Royce approval form[2] and confirm agreement with Rolls-Royce Technical Authority.
NOTE 1: This is an element of the PPAP file and may be required for the Submission (PPAP Submission).

NOTE 2: An example of a Rolls-Royce approval is the Progressive Definition Release Communication Sheet.

4.5 Phase 3 Requirements – Process Design and Development

Comply with AS/EN/SJAC 9145:2016

Supplemental Requirements
Suppliers shall:
a) Develop Value Stream Map[1] as part of the process design deliverables.
b) Develop the Measurement Systems Analysis (MSA) Plan[2] in accordance with AS13003.

c) Conduct Process Failure Mode Effects Analysis (PFMEA)[2] in accordance with AS13004.
d) Identify Process Key Characteristics for Initial process studies (initial process capabilities studies).
e) Provide on request by Rolls-Royce the Production Preparation Plan for approval.
f) Include Value Stream Mapping results when conducting Preliminary Capacity Assessment.
g) Include all requirements of the Design record when developing the test / inspection criteria (inspection / test plan)[2] for the production process. When Key Product Characteristics have been specified by Rolls-Royce[3] identify these within the documented test/inspection criteria.
h) Include the requirements of this section when conducting a Production Readiness Review (PRR).

NOTE 1: Value Stream Map relates to an evaluation of the product supply chain (internal and external) and production processes, from the beginning of the process up to the delivery of the product, including as a minimum; physical flow, information flow and key contributing parties. This accounts for; customer demand (e.g. quantity per week or month and lot size), every process step (stating production rate, on-time delivery, lot size and lead time), inventory between process steps (e.g. number of days = quantity / downstream usage) and bottleneck identification. The Value Stream Mapping is validated by; every process step, number of resources, available time, utilisation and efficiency. A single value stream map may apply to a group or family of products.

NOTE 2: This is an element of the PPAP file and may be required for the Submission (PPAP Submission).

NOTE 3: Key Characteristic Feature (KCF), Critical Safety Item (CSI), Conformance Control Features (CCF) and / or Key Characteristic (KC) are examples of Key Product Characteristic. See Appendix C.

4.6 Phase 4 Requirements – Product and Process Validation

Comply with AS/EN/SJAC 9145:2016

Supplemental Requirements
Suppliers shall:

a) Produce a minimum of twenty-five (25) products[1] during the production process run or runs.
b) Use product and data from the production process run(s) to additionally support Rolls-Royce PPAP Elements[2] 11, 13, 14, 16, 17[3] and 18 (as required).
c) Conduct MSA for the test / inspection criteria in accordance with AS13003.
d) Provide Initial process studies[1] to Rolls-Royce for features designated as CCF, KCF and CSI, along with KCs from the Design Record[2] when requested by Rolls-Royce and in accordance with Appendix D.

NOTE: Product KCs include Key Characteristic Feature (KCF), Conformance Control Feature (CCF) and Critical Safety Item (CSI) specified by Rolls-Royce.

NOTE 1: The minimum of twenty-five (25) products may alter when authorised by the Rolls-Royce Technical Authority via the purchase order or PPAC form and when significant production volumes exist (>25) or in circumstances where low production volumes exist (<25).

NOTE 2: This is an element of the PPAP file and may be required for the Submission (PPAP Submission).

NOTE 3: AS/EN/SJAC 9145:2016, clause 4.6.6 capacity verification is confirmed by Rolls-Royce PPAP Element 17 for the product or process in scope.

4.7 Phase 5 Requirements – On-Going Production, Use and Post-Delivery Services

Comply with AS/EN/SJAC 9145:2016

5 PRODUCTION PART APPROVAL PROCESS REQUIREMENTS

Comply with AS/EN/SJAC 9145:2016

NOTE: All questions concerning the need for PPAP are addressed to the Rolls-Royce Technical Authority.

5.1 Process Requirements for Production Part Approval Process

Comply with AS/EN/SJAC 9145:2016

Supplemental Requirements

Suppliers shall:

a) Define the person(s) responsible for PPAP and their qualification (supplier PPAP Co-ordinator). Include Rolls-Royce Customer Specific requirements within the qualification.
b) Notify the Rolls-Royce Technical Authority to determine the requirements for approval when change occurs to:
   - Product design (design / make suppliers only)
   - Production process design (for product subject to RRES 90000 or First Article Inspection)
   - Facility and / or subcontractor and / or sub-tier
c) Establish a PPAP file[1] for a specific product or product group or family[2] no later than the Plan for PPAP (Rolls-Royce PPAP Event) and:
   - Identify the Supplier PPAP Co-ordinator for the PPAP file
   - Gather data as it is produced, analyse the result and provide feedback to Rolls-Royce when concerns and / or mitigating action(s) are likely to impact the Customer
   - Retain the PPAP file at the manufacturing location
   - Make the PPAP file available for review or witness by Rolls-Royce in accordance with Appendix E
d) Provide the submission to the Rolls-Royce Technical Authority before production product is shipped or on a date agreed with them. Unless otherwise specified by the Rolls-Royce Technical Authority use Submission Level 3 as the default in accordance with Appendix E.

NOTE 1: The actual file can contain the evidence or provide links to the evidence provided this is understandable upon review by or submission to Rolls-Royce. Data / information for all applicable PPAP elements should be retained at appropriate locations (including manufacturing) regardless of the associated Submission Level (SL).

NOTE 2: A product group or family PPAP file may be implemented when appropriate. However, submissions must only be made on an individual part number basis.

5.2 Production Part Approval Process File and Submission

Comply with AS/EN/SJAC 9145:2016

Supplemental Requirements
Suppliers shall:

a) Meet all specific requirements of the Rolls-Royce PPAP Elements in accordance with Appendix G.
b) When required for submission, provide documentation in an organisation specific format[1] unless specific format and / or method stated for a Rolls-Royce PPAP Element and provide evidence of the requirement.
c) Ensure that the Supplier PPAP Co-ordinator for the product has reviewed and authorised the Production Submission Warrant (PSW)[2]. When PPAP Elements have not been completely fulfilled define the non-compliances within the submission, provide an action plan for full compliance and state a commitment date for re-submission.
d) Complete a separate PSW[2] for each product definition within the scope of the submission.

NOTE 1: Organisation-specific format is a format that is suitable to the Supplier's operation and provides the required information / data / documentation in an understandable format to the Rolls-Royce Technical Authority

NOTE 2: Production Submission Warrant (PSW) is the Rolls-Royce specific PPAP Approval form.

5.3 Production Part Approval Process Disposition

Comply with AS/EN/SJAC 9145:2016

Supplemental Requirements
Suppliers shall:

a) Manage product supply in accordance Appendix F, Production Product Approval table, and any additional instructions detailed on the PSW.
b) If required, implement containment actions to ensure that only acceptable product is shipped to Rolls-Royce.

NOTE: Interim Approval or Reject does not mean Approved.

Appendix A – Quality Management System Certification Requirements

	Supplier Type	Rolls-Royce Approval Required?	Minimum Third Party Approval Requirements (Suppliers can define higher requirements based upon risk)
Production Product and Development Product	Production components, including all Subtiers - all classifications	Yes	AS/EN/JISQ 9100[10]
	Metallic Raw Material Manufacturer (RR aerospace grade material e.g., MSRR, RRMS, EMS)	Yes	AS/EN/JISQ 9100
	Metallic Raw Material Manufacturer (national/international grade material e.g., AMS)	No[1]	ISO 9001
	Metallic Raw Material Reprocessor (RR aerospace grade material e.g., MSRR, RRMS, EMS)	Yes[9]	ISO 9001
	Metallic Raw Material Reprocessor (national/international grade material e.g., AMS)	No	ISO 9001
	Sub-tier conventional rough machining (including test material removal, Band sawing bar stock, removal of casting risers etc) using material issued by the supplier (purchaser) and where the product verification and release is performed by the supplier (purchaser).	No	ISO 9001
	Sub tier conventional machining and cold forming operations of non-RRES90000 controlled parts using material issued by the supplier (purchaser) and where the product verification and release is performed by the supplier (purchaser).	No	AS/EN/JISQ 9100
	Non-metallic material, Metallic materials in non-conventional form, and consumables material manufacturer	No	as per RRMS30031 requirements
	Casting & Forging manufacturers	Yes[3]	AS/EN/JISQ 9100
	Special Processes (MLC127 Nadcap processes) for production make-to-print components	Yes[9]	AC7004 & Nadcap **or** AS/EN/JISQ 9100 & Nadcap
	Special Processes (MLC127 Nadcap processes) for production design-make components	No	AC7004 & Nadcap **or** AS/EN/JISQ 9100 & Nadcap
	Special Processes for production make-to-print components (non-Nadcap processes)	Yes	AS/EN/JISQ 9100
	Special Processes for production design-make components (non-Nadcap processes)	No[8]	AS/EN/JISQ 9100
	Non destructive test houses for production make-to-print components (i.e., facilities that only perform NDT)	Yes[9]	AC7004 & Nadcap **or** AS/EN/JISQ 9100 & Nadcap
	Non destructive test houses for production design-make components (i.e., facilities that only perform NDT)	No[8]	AC7004 & Nadcap **or** AS/EN/JISQ 9100 & Nadcap
	Commercial-Off-The-Shelf (COTS) components	No	ISO 9001
	Standard catalogue components	No	ISO 9001[4]
	Sub tiers to Standard Parts Manufacturer	No	ISO 9001
	Deliverable software	Yes	AS/EN/JISQ 9100
	Scrapping of parts	No	ISO 9001
	Decals/Transfers, Name Plates	No	ISO 9001
	Ground Support Equipment (engine covers, blanks etc.)	Yes	ISO 9001
Manufacturing or Maintenance Services	Integrator	Yes	AS/EN/JISQ 9100 or AS9120
	Raw Material Stockist / Distributor	No	ISO 9001[5]
	Rolls-Royce Component Stockist	Yes[9]	AS/EN/ 9120 **or** ASA-100
	Materials Testing Laboratory [acceptance and release of production material (Chemical, Metallographic, Mechanical testing Uniaxial and constant load testing)]	No	Nadcap **or** ISO/IEC 17025 **or** Equivalent National Accreditation[2,6]
	Repair & Overhaul	Yes[9]	AS/EN/JISQ 9100 **or** 9110 **or** National Aviation Authority Part 145
	Inspection and measurement services	No	ISO/IEC 17025 **or** AS/EN/JISQ 9100 **or** AC 7004
	Calibration laboratories	No	ISO/IEC 17025 **or** calibration traceable to a laboratory holding ISO/IEC 17025
Engineering Services	Integrator	Yes[10]	AS/EN/JISQ 9100 or AS9120
	Materials Testing Laboratory [dynamic mechanical testing (multidirectional and changing load)]	No[7]	Nadcap or ISO/IEC 17025 or Equivalent National Accreditation
	Design service providers (RRES90009) of all tasks or services non power plant (including instrumentation)	Yes[9,10]	ISO 9001
	Design Service Provider's (RRES90009) of all tasks or services for power plant use	Yes[10]	AS/EN/JISQ 9100
	Inspection and measurement services	No[10]	ISO/IEC 17025 **or** AS/EN/JISQ 9100 **or** AC 7004
	Calibration laboratories	No[10]	ISO/IEC 17025 **or** calibration traceable to a laboratory holding ISO/IEC 17025

Note 1: Use of continuous cast steel bar products is restricted for use unless it is procured from a Rolls-Royce approved mill, allowed by product definition or is approved by the Rolls-Royce Technical Authority
Note 2: Captive laboratories may utilise AS/EN/JISQ 9100 provided that the scope incorporates Manufacture and Testing of Material, and the supplier participates in the Rolls-Royce Approved Proficiency Testing Programme (https://ptpscheme.com)
Note 3: Approval required only when a Rolls-Royce casting or forging control specification is invoked by the Rolls-Royce product definition.
Note 4: Only qualified manufacturers (i.e., they appear on the qualified products list) shall be used when specified in a related technical specification.
Note 5: Stockist/distributor must provide traceability to an approved raw material manufacturer.
Note 6: All Rolls-Royce specifications and requirements for the testing must be flowed down to the facility completing the testing by their direct customer. Additionally, for materials controlled by RRMS30031, exceptions to approval requirements may be noted in MLC104.
Note 7: Requires approval by Rolls-Royce Technical Authority.
Note 8: For suppliers where the Special Process being used is not mandated in MLC 127 it is required that the Purchaser must enact controls of their Special Processes or their sub-tier Special Processes.
Note 9: For Rolls-Royce approval only Rolls-Royce Aerospace supplemental applies
Note 10:Compliance with RRES90009 must be established with each affected Rolls-Royce entity.

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Appendix B – Minimum Document Retention Periods

Category A Indicates the record will be retained for statutory or regulatory requirements. The minimum time period for a Category A record relating to products will be ten years after the product type is withdrawn from use (i.e. withdrawal of type certificate or notification of the withdrawal for support in the case of military aerospace products).

Category B Indicates the record will be retained for business requirements. The retention period for Category B records will be six years however this may be adjusted based on the business requirement.

SABRe Clause	Document / Record	SABRe Edition 3 Archiving Category
6.1	Records of risk management	B
7.1.5	Records of MSA	A
7.2	Records of training and competence	Period of employment +3 Years
8.2.3	Review of requirements related to the product	B
8.3.1	Design Technical Data Package	A
8.3.6	Records of definition alteration	A
8.4.1	Records of purchasing / subcontracting	B
8.4.1	Records of receipt inspection and supporting documentation	A
8.4.1	Maintain records of subcontractor / sub-tier supplier monitoring	B
8.4.2.1	Records of work transfers (source change)	B
8.5.1	Records of reduced sample inspection	A
8.5.1	Records of variation management for products specified as "Fixed Process Control"	A
8.5.1	Records of variation management for product **not** specified as "Fixed Process Control"	B
8.5.1.1	Tooling control records	B
8.5.1.3	Records of vision standards	Period of employment +3 Years
8.5.1.3	Records of product verification for product specified as "Fixed Process Control"	A
8.5.1.3	Records of product verification for product **not** specified as "Fixed Process Control"	B
8.5.1.3	FAIR / LAIR	A
8.5.1.3	Fixed process control	A
8.5.2	Records of product identification, traceability and serialisation	A
8.6	Records of release documentation	A
8.7	Records related to the control of nonconforming product	A
8.7.3	Records of deviation permits / concessions	A
8.7.4	Records of reworked product	A
9.1.1	Records of process performance metrics	B
9.2	Records of internal audits	B
10.2	Records of corrective action	B
10.2	Records of PFMEA	B
10.2	Records of control plans	B
Section 2	PPAP file	B

Appendix C – Key Product Characteristic Classifications

Classification	Drawing Symbol	What this means
Critical	⊕	Critical characteristics are the most important on the component and failure could directly lead to a hazardous failure.
Significant	⊖	Significant characteristics are important characteristics which through a chain of events could lead to a hazardous failure but the product is designed to prevent this occurring. Failure however could be very disruptive to our customers.
KCF	KCF or Flag Note	These directly affect the performance of our product (e.g. fuel efficiency), typically these require special controls such as variation management.
Unclassified	Not Applicable	Unclassified characteristics are those that do not meet the criteria for Critical, Significant, KCF or CCF.

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Appendix D – Reaction Plan

Results (Cpk)	Reaction Plan
≥ 1.33 (≥ 2.0 for Civil Aerospace NPI)	Submit to the Rolls-Royce technical authority to enable approval by Rolls-Royce (meets the acceptance criteria).
1.00 to < 1.33 (≥ 2.0 for Civil Aerospace NPI)	Contact Rolls-Royce Technical Authority to determine acceptability and if applicable, implement a corrective action plan to improve capability.
< 1.00	Contact the Technical Authority if the acceptance criteria cannot be attained by the required submission date, submit a corrective action plan for approval and continue with variation reduction activities.

Appendix E – Submission Levels

Submission Table of Requirements							
AS9145 PAP Element Ref.	Rolls-Royce PPAP Elements 1 to 21		Submission Level				
			SL1	SL 2	SL 3	SL 4	SL 5
1	1	Product definition / engineering specification	S R	S R	S R	C R	S R W
10	2	Authorised engineering change documents	S R	S R	S R	C R	S R W
10	3	Customer engineering approvals	R	S R	S R	C R	S R W
2	4	Design Failure Mode and Effects Analysis (DFMEA)	R	R	S R	C R	S R W
3	5	Process flow diagram	R	R	S R	C R	S R W
4	6	Process Failure Mode and Effects Analysis (PFMEA)	R	R	S R	C R	S R W
5	7	Control plan	R	S R	S R	C R	S R W
10	8	Test / inspection criteria and planning	R	S R	S R	C R	S R W
10	9	Qualified laboratory documentation	R	R	S R	C R	S R W
8	10	Packaging and labelling standard and documentation	R	R	S R	C R	S R W
10	11	Sample production product	R	S R	S R	C R	S R W
6	12	Measurement System Analysis verification	R	R	S R	C R	S R W
10	13	Dimensional results	R	S R	S R	C R	S R W
10	14	Records of material / performance test results	R	S R	S R	C R	S R W
7	15	Initial process studies	R	S R	S R	C R	S R W
10	16	Process control surveillance results	R	R	S R	C R	S R W
10	17	Initial manufacturing performance studies	R	R	S R	C R	S R W
10	18	Customer-specific requirements	R	S R	S R	C R	S R W
9	19	First Article Inspection Report (FAIR)	S R	S R	S R	S R	S R W
10	20	Process Control Document (PCD)	S R	S R	S R	S R	S R W
11	21	Production Submission Warrant (PSW)	S R	S R	S R	S R	S R W

Key / Legend	
S	Submit to Rolls-Royce (or nominated representative).
R	Retain a record as part of the PPAP file and make available to the customer upon request.
C	Consult Rolls-Royce – submission (S) and/or witness (W) may be required.
W	Witness by Rolls-Royce (or nominated representative) through a supporting data/information review at manufacturing location.

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Appendix F – Production Product Approval table

Production Product Approval (PPA)		Required Action	
PPA Status	PPA Classification	(for managing production product supply/corrective action)	
Approved		Allowed to ship product.	
Interim Approval	B	Allowed to ship product[1] for an agreed period or quantity and with: • Specific instructions from the Rolls-Royce technical authority (Customer Authorised Representative [CARe]	By an agreed date implement action plan and re-submission Production Submission Warrant (PSW).
	C		
	D		
	E	Allowed to ship product[1] for an agreed period or quantity and with: • Approved non-conformance documentation, • Specific instructions[1] from the Rolls-Royce technical authority (Customer Authorised Representative [CARe]	
Reject	R	NOT permitted to ship product and must obtain specific instructions[1] from the Rolls-Royce technical authority (Customer Authorised Representative [CARe].	

Note 1: The production supply organisation is responsible for implementing containment actions to ensure that conforming product is shipped to Rolls-Royce

Appendix G – Rolls-Royce PPAP Elements Requirements Table

Rolls-Royce PPAP Elements			Specific Requirements
PPAP Elements	AS9145 Ref.	Description	
1	1	Product definition / engineering specification	Either have records of the latest engineering definition/specification release (Design Record), which fully define the product (forging, casting, component, unit and /or assembly) including physical or electronic drawings, electronic models Or any other information[1] that defines the final product that is relevant to the engineering definition and organisation. *NOTE 1: An example would be the Repair Scheme for repair process or a developed technical package from the prior supply source when transferring product from one facility to another facility.*
2	10	Authorised engineering change documents	If applicable, have records of any authorised engineering change document(s) for those changes not yet recorded in the product definition/engineering specification (Rolls-Royce PPAP Element 1) but incorporated in the product. When required by submission level and applicability of the authorised engineering change, provide a copy of the documented authorisation. *NOTE: Examples of authorised engineering change are Drawing Alteration Requests (DAR), Design Change Proposal (DCP), Advanced Engineering Memorandum (AEM) and for repair Request for Manual Revision (RMR)*
3	10	Customer engineering approvals	If applicable, have obtained customer engineering approval for: • Design Verification Plan and Report or equivalent, Design Make only (Phase 2 Requirements – Product Design and Development) • Deviation permit, Concession (SABRe 8.7.3) • For parts subject to RRES 90000 (SABRe 8.5.1.3)
4	2	Design Failure Mode and Effects Analysis (DFMEA)	In accordance with Phase 2 Requirements – Product Design and Development of this document
5	3	Process flow diagram	In accordance with Phase 3 Requirements – Process Design and Development of this document
6	4	Process Failure Mode and Effects Analysis (PFMEA)	In accordance with Phase 3 Requirements – Process Design and Development of this document
7	5	Control plan	In accordance with Phase 3 Requirements – Process Design and Development of this document
8	10	Test / inspection criteria and planning	In accordance with Phase 3 Requirements – Process Design and Development of this document When required by submission level, use the Rolls-Royce form Test Inspection Criteria or an equivalent. *NOTE: An equivalent to a Test / inspection criteria can be a Characteristic matrix when this contains the content of Test Inspection Criteria form. A Characteristic matrix is a documented matrix demonstrating the relationship between process parameters and processing activities.*
9	10	Qualified laboratory documentation	When material / performance tests are specified within the test / inspection criteria (Rolls-Royce PPAP Element 8) have records that demonstrate that these have been performed by an accredited laboratory. The accredited laboratory (internal or external to the product supply organisation) shall have a laboratory scope and documentation showing that the laboratory is qualified for the type of measurements or tests conducted.
10	8	Packaging and labelling standard and documentation	In accordance with Phase 3 Requirements – Process Design and Development of this document *NOTE: Where approval is required (AS/EN/SJAC 9145:2016, clause 4.5.2) it should take place as part of submission.*

Rolls-Royce PPAP Elements			Specific Requirements
PPAP Elements	AS9145 Ref.	Description	
11	10	Sample production product	When required by the internal Customer Authorised Representative (CARe) or cascade of customer-specific requirements (Rolls-Royce PPAP Element 18) provide sample product as specified. *NOTE: When required sample products are castings, forgings, components, units or assemblies related to the product documented within the internal customer submission. Depending on what is specified, they can be used to support cosmetic or functional approval, or aid up / downstream manufacturing evaluation of fit or producibility.*
12	6	Measurement System Analysis verification	In accordance with Phase 4 Requirements – Product and Process Validation of this document
13	10	Dimensional results	Have produced dimensional reports for no less than five[1] (5) randomly selected products produced during the production process run and in accordance with the test / inspection criteria (Rolls-Royce PPAP Element 8). Evaluate conformity and record results. When required by submission level, use the Rolls-Royce form DRR or an equivalent *NOTE 1: The minimum of 5 products may alter when authorised by the Customer Authorised Representative (CARe) when significant production volumes exist >5 or circumstances where low production volumes exist <5.*
14	10	Records of material / performance test results	Produce material / performance test reports for any material / performance tests specified within the test / inspection criteria (Rolls-Royce PPAP Element 8). The quantity of product is as required by test / inspection criteria and the number of products produced during the production process run. Evaluate conformity and record results. When required by submission level, use the Rolls-Royce form MTR (for material test) or PTR (for performance test) or equivalent[1] *NOTE 1: When an external / commercial laboratory is used, submitted results on the laboratory letterhead or the normal laboratory report format is acceptable when this identifies the name of the laboratory that performed the tests, the date(s) of the tests, and the standards used to run the tests.*
15	10	Initial process studies	Provide Initial process studies for features designated as CCF, KCF and CSI, along with KCs identified within PPAP Element 1
16	10	Process control surveillance results	Have conducted product and production process surveillance[1] during the production process run that include the criteria detailed in process control surveillance form. Evaluate the results, record and address any non-conformity. When required by submission level, use the Rolls-Royce form Process Control Surveillance. *NOTE 1: The surveillance should apply a suitable sampling method for the nature of the product, process, production lead-times and potential/known concerns.*
17	10	Initial manufacturing performance studies	Have a record of the expected production volumes as cascaded by the customer or the expected production volumes by evaluating delivery schedule cascaded by the customer. Have determined the expected customer demand rate[1]. Have conducted manufacturing process performance studies during a production process run to determine the following for each operational step: • Total number of product produced, • Total number of conforming products, • Total process time required to produce the products, • Total available process time, • Total process time for all other product produced from the process, • Equipment availability. Evaluate the results to determine the potential to satisfy customer demand rate and support production quantities at a consistent quality level. When required by submission level, use the Rolls-Royce form QCAR *NOTE 1: Customer Demand Rate is the number of products produced by the production supply organisation over a specified period of time to satisfy the delivery schedule cascaded by Rolls-Royce.*
18	10	Customer-specific requirements	Have records of compliance for all applicable customer specific requirements[1] cascaded through the Purchase Order / use of Production Product Approval Checklist (Rolls-Royce form PPAC) and SABRe. Have records that demonstrate sub tier/subcontractor can meet the intent of Rolls-Royce PPAP Element 17. *NOTE 1: Examples of Customer Specific Requirement maybe; Rate targets (e.g.: Units Per Week target values) or validations such as a requirement to capture weight data, details of equivalency validation requirements during Source Change, agreement on process quality performance targets (RFT, DPU, etc.), requirements to sign-off 2nd tier PSW by Rolls-Royce technical authority (Customer Authorised Representative [CARe]) and requirements of Rolls-Royce customers associated with verification and/or validation and/or their Customer Specific Requirements.*
19	9	FAIR	In accordance with Phase 4 Requirements – Product and Process Validation of this document
20	10	Process Control Document (PCD)	For KCF / CCF / CSI Initial process studies provide process control document (PCD) *NOTE: Process Control Document (PCD) approval can be prior to, or as part of the customer submission*
21	11	Production Submission Warrant (PSW)	Use the Rolls-Royce PSW form as PPAP Approval Form and provide verification that: a) All customer / design engineering requirements are properly understood and recorded, b) All the results demonstrate conformance to customer / design engineering requirements, c) Satisfactory process control (Rolls-Royce PPAP Element 16) and conformity to requirements is deployed within the production manufacturing process, d) Process capacity results demonstrate rate potential to customer demand rate requirements.

Change History

Revision	Date	Description of Change	Author	Owner	Approval
1.0	2 April 2018	New edition to accommodate the latest changes to AS/EN/JISQ 9100:2016 and AS/EN/SJAC 9110:2016	Robert Starcke	Paula Adkins	Paula Adkins

Document update policy

This document may be updated periodically. Major updates will be indicated by an increase to a higher revision number (e.g. revision 1.0 to revision 2.0). Minor updates and corrections will be indicated by a decimal change in the revision number (e.g. revision 1.0 to revision 1.1).

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