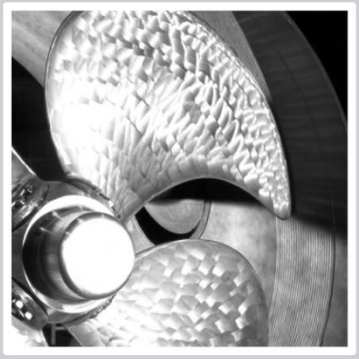
SABRe Design & Development Process

Rolls-Royce

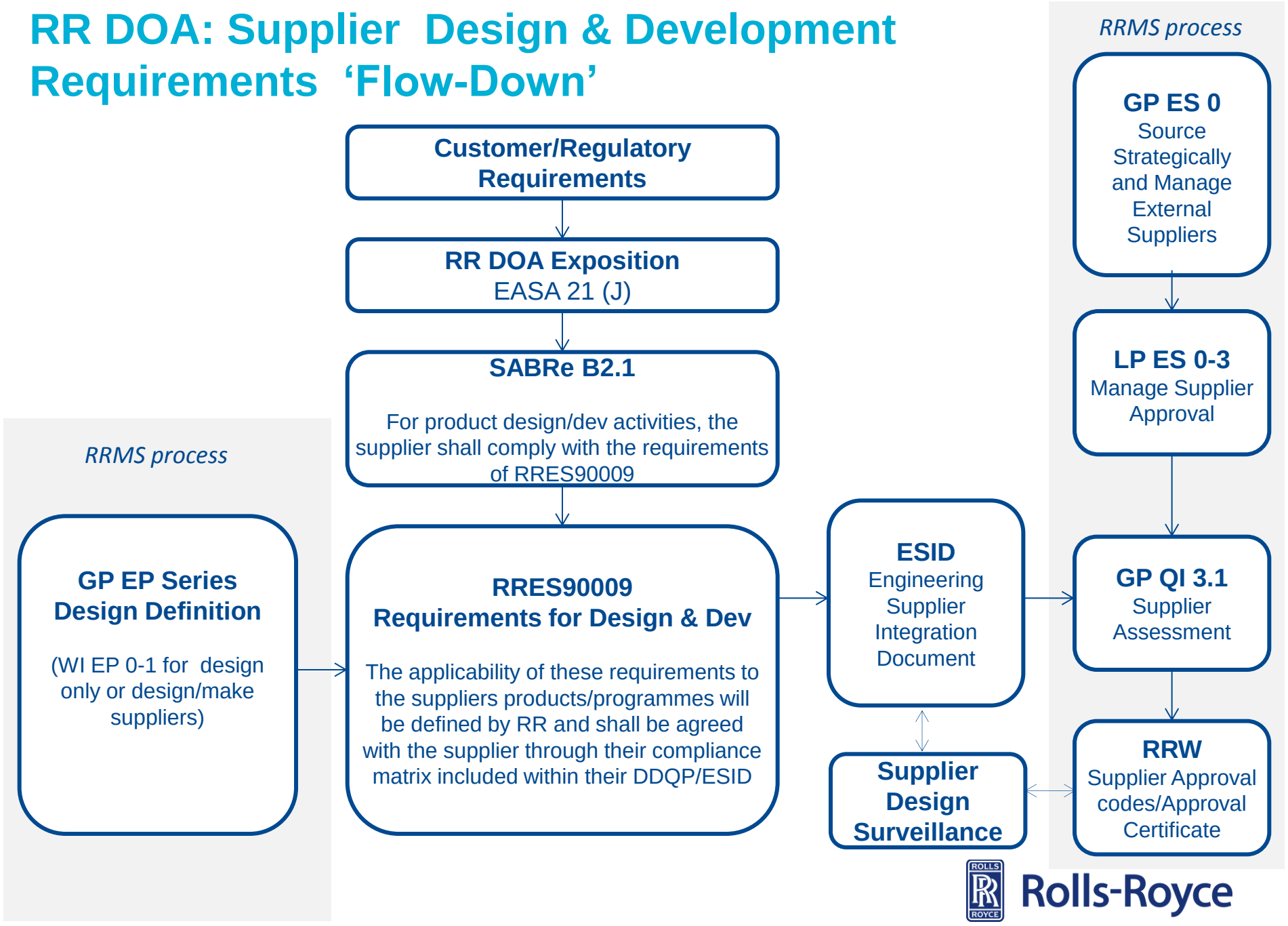
The Design & Development process in the Design Sub Contract supply chain

Issue 4 - April 2017




RR DOA: Supplier Design & Development Requirements 'Flow-Down'



Design Organisation Approval (DOA)Exposition

Extract from RRD EASA DOA Exposition Item 10

- Engineering design work (including test and analysis) may be undertaken by external organisations under the control of the Rolls-Royce Deutschland DOA. The global Rolls-Royce Specification **RRES 90009** (Requirements for Design and Development Activities) contains the set of requirements applicable to the management of RRD Design Supplier and to any inter-company trading within the Rolls-Royce community.

- External organisations carrying out such work require approval by Rolls-Royce consistent with the type of work and the organisation concerned. VA.SB.0100 (Quality Assurance System Requirements for Suppliers to Rolls-Royce Deutschland Ltd & Co KG), VA.SB.0060 (Approval and Authorization of Supply Sources), VA.SB.0206 (Procurement of Investments, Services and Non-aeronautical Items), GP SB 2 (Create Integrated Commodity Strategies) and GP SB 5 (Maintain Supplier) provide the procedural and control requirements for this. **SABRe** (Supplier Advanced Business Relationship) is the controlling Quality System for all Rolls-Royce suppliers. **SABRe** is issued to all suppliers. It describes the Rolls-Royce Deutschland requirements and processes and is a mandatory requirement placed on all suppliers.

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DOA Exposition

Extract from Rolls-Royce UK MISC3309 EASA Design organisation exposition Item 13

- Engineering design work (including test and analysis) may be undertaken by external organisations under the control of the Rolls-Royce plc DOA.

- External organisations carrying out such work require approval by Rolls-Royce consistent with the type of work and the organisation concerned. GP ES 0 (Source Strategically and Manage External Suppliers) provides the procedural and control requirements for this. The Rolls-Royce Supplier Management System, known as **SABRe**, is the controlling Quality System for all Rolls-Royce suppliers. **SABRe** is located within the **RRMS** and is also provided to all suppliers. It describes the Rolls-Royce plc requirements and processes and is a mandatory requirement placed on all suppliers.

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Design/Make or Design/Development Suppliers

RRMS process - WI EP 0-1 (Manage design only or design and make suppliers)

Design only or design and make suppliers shall have procedures that meet the requirements of RRES 90009 Requirements for Design and Development Activities and shall operate their procedures to meet the rules of GP EP 0. Design only or design and make suppliers shall be managed according **WI EP 0-1.**

- **Purpose**
  - This Work Instruction defines the operation of Engineer Products procedures using Design only or design and make suppliers within the team. A Design only or design and make supplier is one where reliance is put upon their specialist engineering knowledge or competence to develop product definition data or supply design or development (that is verification by physical testing) tasks specifically for a Rolls-Royce application.
- **Applicability**
  - This global Work Instruction is applicable to GP EP 0 and its sub-procedures and is applicable at product, system or component level. The term Design only or design and make suppliers includes suppliers producing designs specifically for a Rolls-Royce application, risk and revenue sharing partners, joint ventures and other Rolls-Royce companies (legal entities).

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Source Strategically and Manage External Suppliers

RRMS process – GP ES 0 (Source Strategically and Manage External Suppliers)

The purpose of this process is to set the principles and key steps by which Rolls-Royce sources from and manage external suppliers, and the principles for managing external supplier relationships.

- **LP ES 0-3 - Manage Supplier Approvals**

  This LP prescribes the methods to be used for managing supplier approvals.

  - **Supplier Approval Process Manager**

    This document provides instructions for the application of LP ES 0-3 (A,N) – Manage Supplier Approval for employees working in the Aerospace and Infrastructure & Services areas of Rolls-Royce. It must be used in conjunction with GP QI 3.1 Manage Internal & Supplier Audit where audit activity of the supplier is being conducted.

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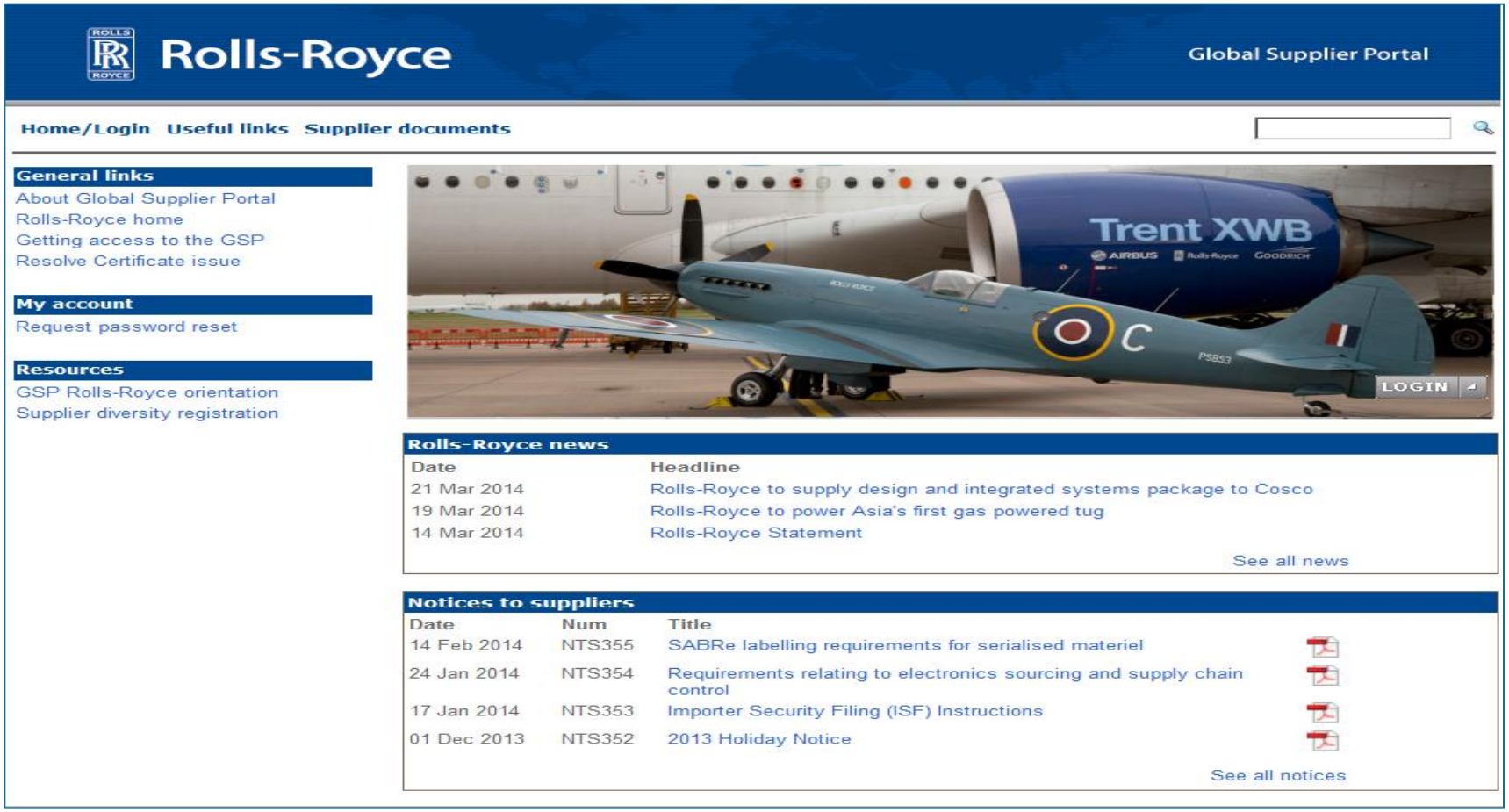
Getting started – SABRe/RRES 90009

(supplier access)



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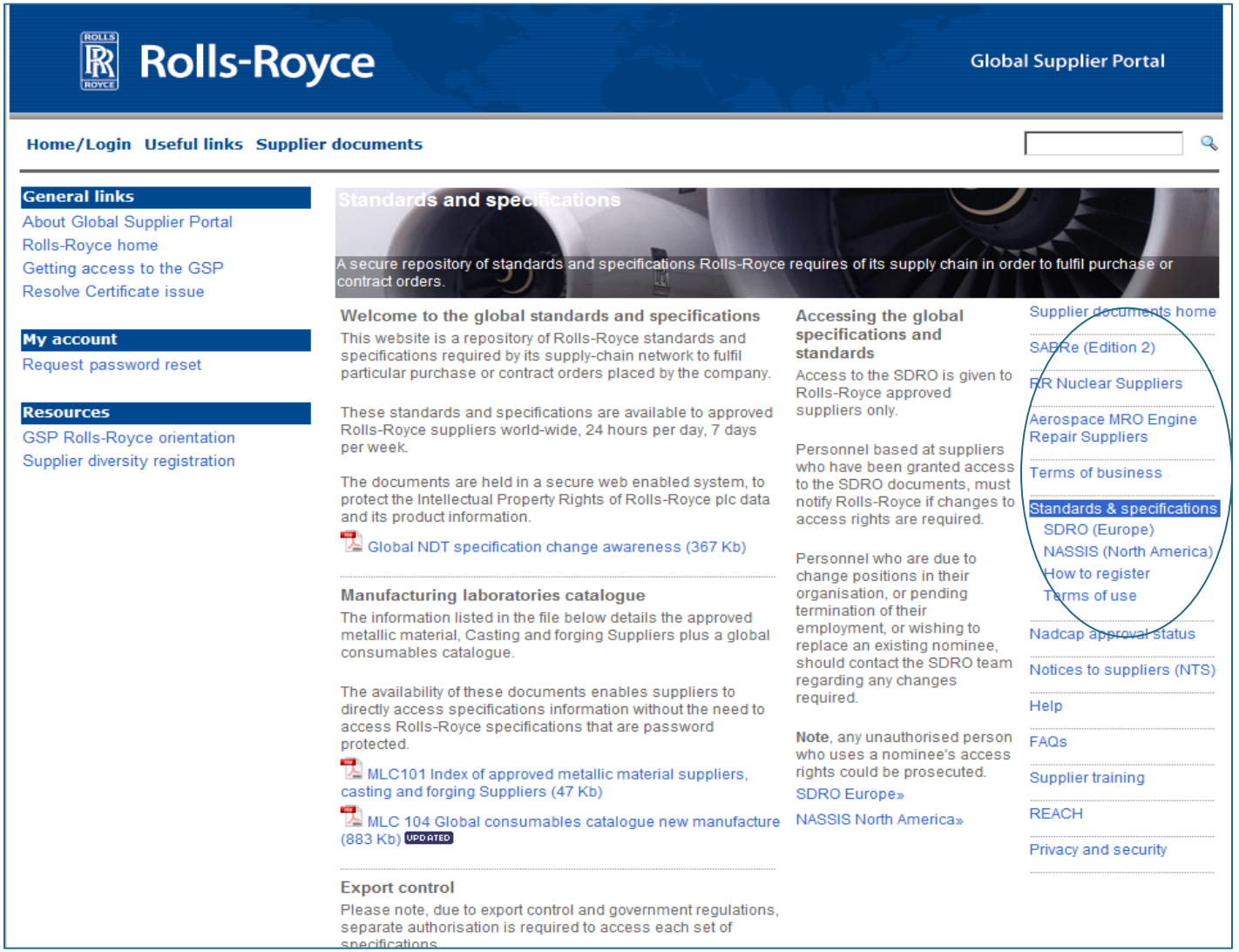
Getting started – SABRe/RRES 90009



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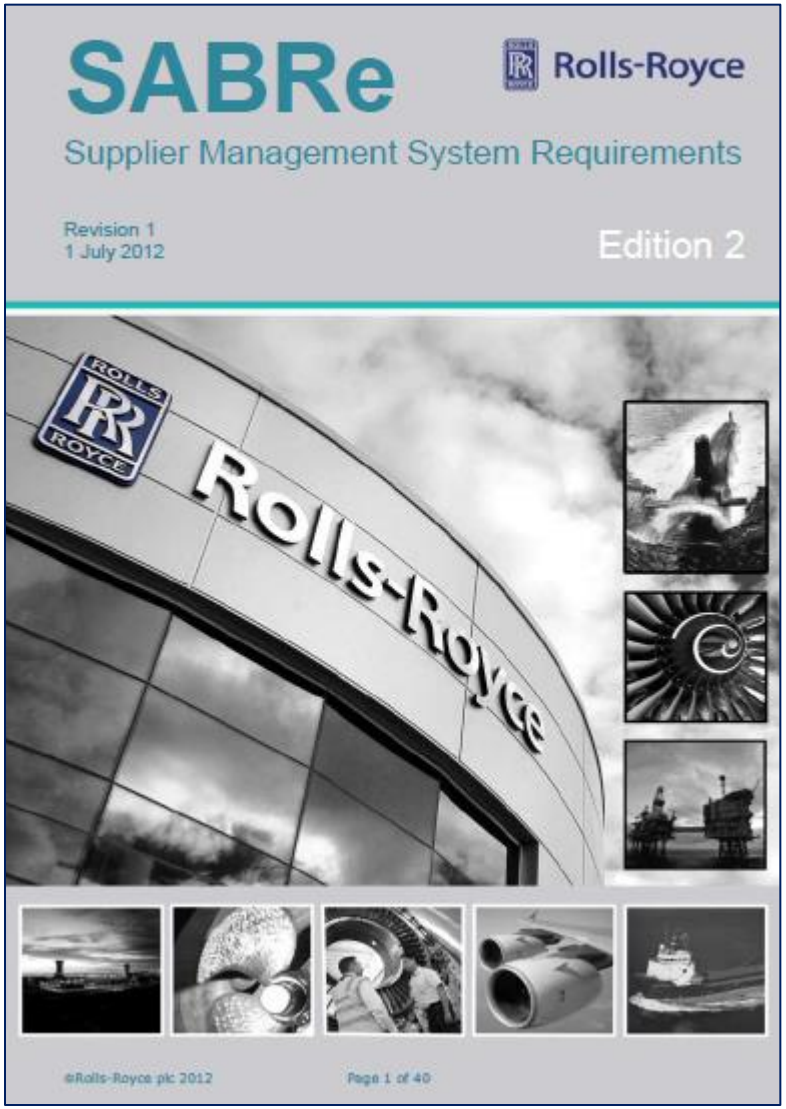
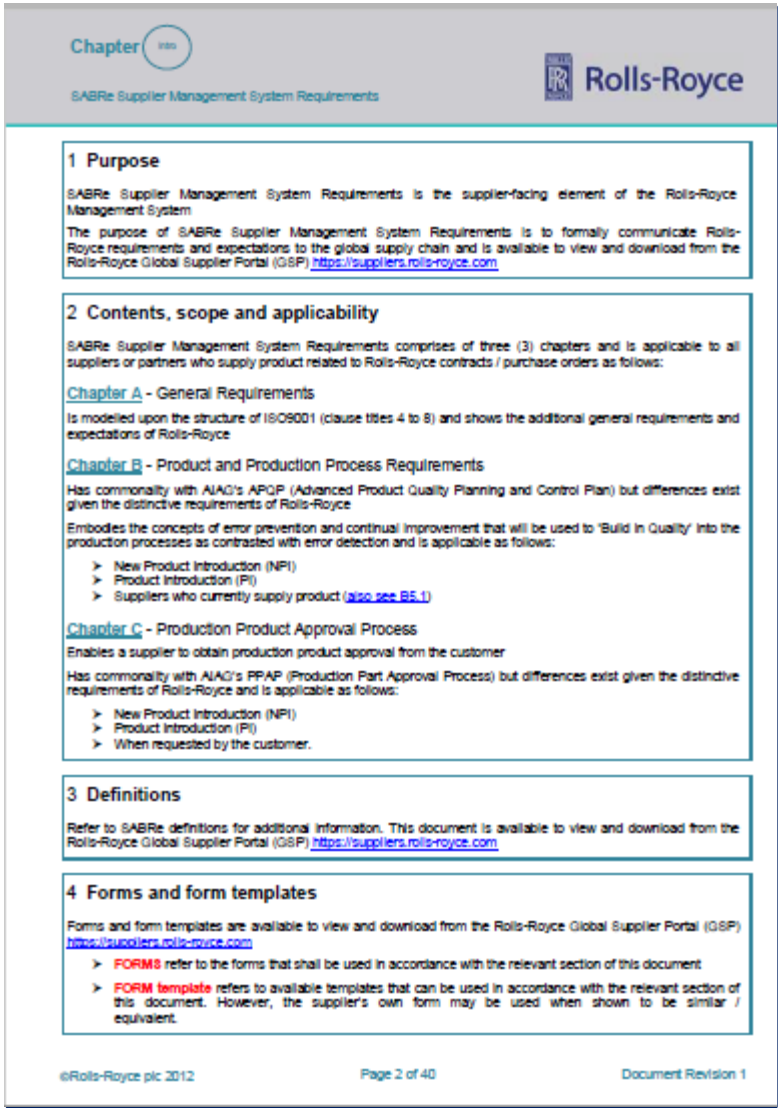
SABRe



Rolls-Royce

SABRe



Chapter intro

SABRe Supplier Management System Requirements

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1 Purpose

SABRe Supplier Management System Requirements is the supplier-facing element of the Rolls-Royce Management System

The purpose of SABRe Supplier Management System Requirements is to formally communicate Rolls-Royce requirements and expectations to the global supply chain and is available to view and download from the Rolls-Royce Global Supplier Portal (GSP) https://suppliers.rolls-royce.com

2 Contents, scope and applicability

SABRe Supplier Management System Requirements comprises of three (3) chapters and is applicable to all suppliers or partners who supply product related to Rolls-Royce contracts / purchase orders as follows:

Chapter A - General Requirements

Is modelled upon the structure of ISO9001 (clause titles 4 to 8) and shows the additional general requirements and expectations of Rolls-Royce

Chapter B - Product and Production Process Requirements

Has commonality with AIAG's APQP (Advanced Product Quality Planning and Control Plan) but differences exist given the distinctive requirements of Rolls-Royce

Embodies the concepts of error prevention and continual improvement that will be used to 'Build in Quality' into the production processes as contrasted with error detection and is applicable as follows:

- New Product Introduction (NPI)
- Product Introduction (PI)
- Suppliers who currently supply product (also see B5.1)

Chapter C - Production Product Approval Process

Enables a supplier to obtain production product approval from the customer

Has commonality with AIAG's PPAP (Production Part Approval Process) but differences exist given the distinctive requirements of Rolls-Royce and is applicable as follows:

- New Product Introduction (NPI)
- Product Introduction (PI)
- When requested by the customer.

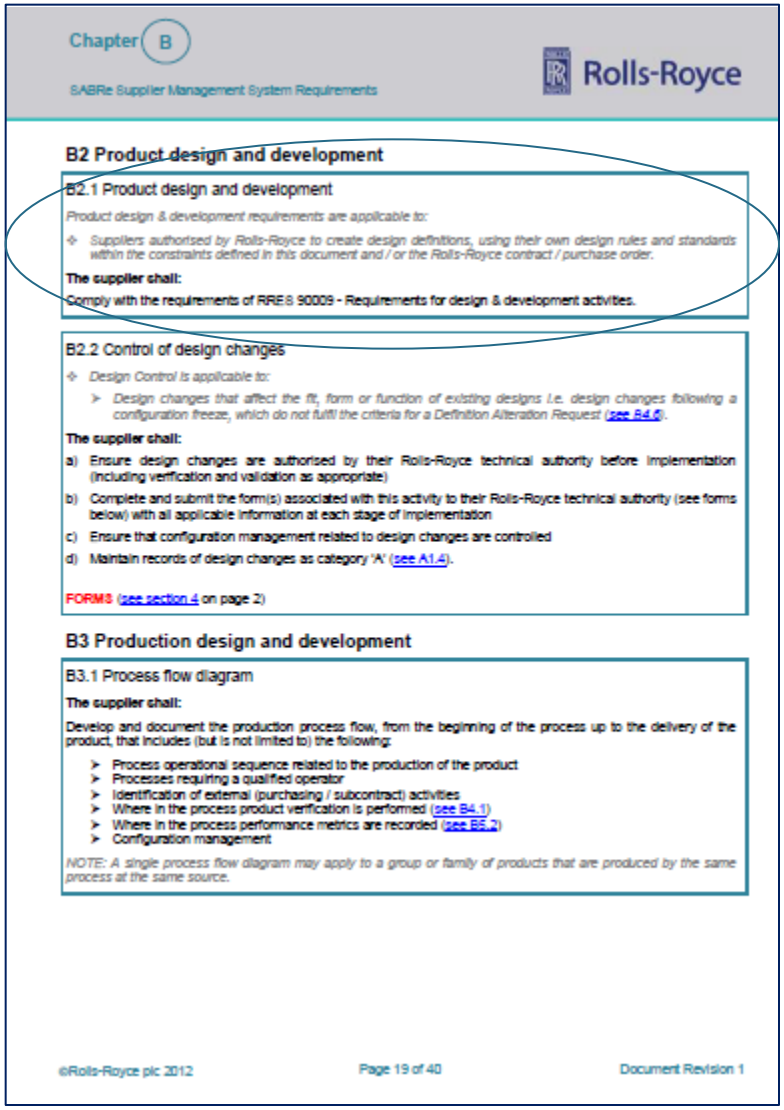
3 Definitions

Refer to SABRe definitions for additional information. This document is available to view and download from the Rolls-Royce Global Supplier Portal (GSP) https://suppliers.rolls-royce.com

4 Forms and form templates

Forms and form templates are available to view and download from the Rolls-Royce Global Supplier Portal (GSP) https://suppliers.rolls-royce.com

- FORM# refer to the forms that shall be used in accordance with the relevant section of this document
- FORM template refers to available templates that can be used in accordance with the relevant section of this document. However, the supplier's own form may be used when shown to be similar / equivalent.



Chapter B

SABRe Supplier Management System Requirements

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B2 Product design and development

B2.1 Product design and development

Product design & development requirements are applicable to:

- *Suppliers authorised by Rolls-Royce to create design definitions, using their own design rules and standards within the constraints defined in this document and / or the Rolls-Royce contract / purchase order.*

The supplier shall:

Comply with the requirements of RRES 90009 - Requirements for design & development activities.

B2.2 Control of design changes

- *Design Control is applicable to:*
  - *Design changes that affect the fit, form or function of existing designs i.e. design changes following a configuration freeze, which do not fulfil the criteria for a Definition Alteration Request (see B4.6).*

The supplier shall:

a) Ensure design changes are authorised by their Rolls-Royce technical authority before implementation (including verification and validation as appropriate)

b) Complete and submit the form(s) associated with this activity to their Rolls-Royce technical authority (see forms below) with all applicable information at each stage of implementation

c) Ensure that configuration management related to design changes are controlled

d) Maintain records of design changes as category 'A' (see A1.4).

FORM3 (see section 4 on page 2)

B3 Production design and development

B3.1 Process flow diagram

The supplier shall:

Develop and document the production process flow, from the beginning of the process up to the delivery of the product, that includes (but is not limited to) the following:

- Process operational sequence related to the production of the product
- Processes requiring a qualified operator
- Identification of external (purchasing / subcontract) activities
- Where in the process product verification is performed (see B4.1)
- Where in the process performance metrics are recorded (see B5.2)
- Configuration management

NOTE: A single process flow diagram may apply to a group or family of products that are produced by the same process at the same source.

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RRES 90009

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ENGINEERING SPECIFICATION

RRES 90009

Revision H

First Issued 25 Mar 2008

Revised 17 May 2016

Requirements for Design and Development Activities

TABLE OF CONTENTS:

Rolls-Royce

Scope.

- The Design and Development process applies to suppliers authorised by Rolls-Royce to create design definitions, using their own design rules and standards.

- Design definitions may range from simple mechanical components to software and complex electronic or mechanical assemblies.

- Note that Design Definitions are complete and detailed descriptions of a product including its functional characteristics, supply chain, cost - as well as how to make, operate, maintain, support it in service and disposal.

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The Design & Development Process.

- The process covers the requirements of Rolls-Royce design processes in the following areas:
  - Organisation and Resource management
  - Programme Management
  - Design
  - Design Verification
  - Validation

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The Design & Development Process

- Rolls-Royce shall initiate work with the supplier to develop a product concept.
- Rolls-Royce will define any contract specific process requirements.
- Rolls-Royce will indicate on a compliance matrix the RRES 90009 requirements applicable to the supplier's products/ programmes.
- The supplier shall assess their Quality Management System against the applicable requirements, and make any necessary updates.

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Rolls-Royce Requirements for Design & Development Activities.

- As a result of service and product development experience, Rolls-Royce recognises that rigorous and meticulous control over all activities and organisations contributing to the product design are essential in reducing risks to product integrity, reliability, quality and business continuity.
- Rolls-Royce requires that the design practices owned by a supplier, (including control of sub-tier suppliers), are at least equivalent to its own.

Rolls-Royce

Rolls-Royce Requirements for Design & Development Activities.

- Design and Development Suppliers shall ensure that they and their supply chain comply with the following requirements:
  - Rolls-Royce Engineering Standard in RRES 90009, RRES 90014 and RRES 90052 (as applicable).
  - Technical Requirements - The Product requirements produced by Rolls-Royce through engagement with Rolls-Royce Customers and the Supplier.
  - Any additional contract specific process requirements.

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Technical Requirements

- The supplier shall agree with Rolls-Royce the technical requirements *(Product requirements produced by Rolls-Royce through engagement with Rolls-Royce and the supplier)*
- Top level requirements from Rolls-Royce are expressed in a Project Requirement Document or Business Requirements Document which is used to help develop the technical requirements.
- The technical requirements may be expressed by a single Technical Requirements Document (e.g. Component Requirements Document, Envelope Drawing, Request for Proposal, Standards Document or any combination of these)

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Technical Requirements

Technical requirements will include (but are not limited to):

- Functional and performance requirements
- Reliability, integrity and life requirements
- Environmental requirements (space, thermal, vibration, etc.)
- Applicable statutory and regulatory requirements
- Applicable Rolls-Royce design policies (e.g. safety)

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Contract Specific Requirements

- The supplier shall agree with Rolls-Royce any additional contract specific process requirements and shall ensure that these requirements are detailed in the supplier's contract with Rolls-Royce.

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The ESID

- The Supplier shall produce and agree with Rolls-Royce an ESID including the completed, Compliance Matrix

- The supplier shall agree with Rolls-Royce the applicability of each RRES 90009 ,90014 & 90052 requirement to the products/programmes of a supplier through the development of the Compliance Matrix included within the ESID

- The ESID (including the Compliance Matrix) must:
  - Demonstrate that the Supplier's design practices give a satisfactory means of compliance to RRES 90009, RRES 90014 and RRES 90052 (as applicable)
  - Demonstrate means of compliance to any additional requirements.
  - Describe interfaces, communications and limits authority between the supplier and Rolls-Royce

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ESID - Update.

- The ESID must be updated as a result of:
  - New or evolving requirements
  - Supplier Quality System improvements
  - Additional scope or new business
- The ESID should cover as many Rolls-Royce global projects / applications as possible.
- Encourage process commonality across a Supplier's Rolls-Royce projects / programmes, minimising differences

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The Design & Development Process.

- The Supplier shall operate as defined within the ESID.
- The Supplier shall adhere to Rolls-Royce's Component Technical Review Process through satisfaction of the Technical Review Requirements in RRES 90009, RRES 90014 and RRES 90052 (as applicable).
- The Supplier shall ensure the ESID remains up-to-date and compliant.
- Rolls-Royce will perform regular surveillance activities to verify the Suppliers compliance to the ESID and assess changing supplier capability.

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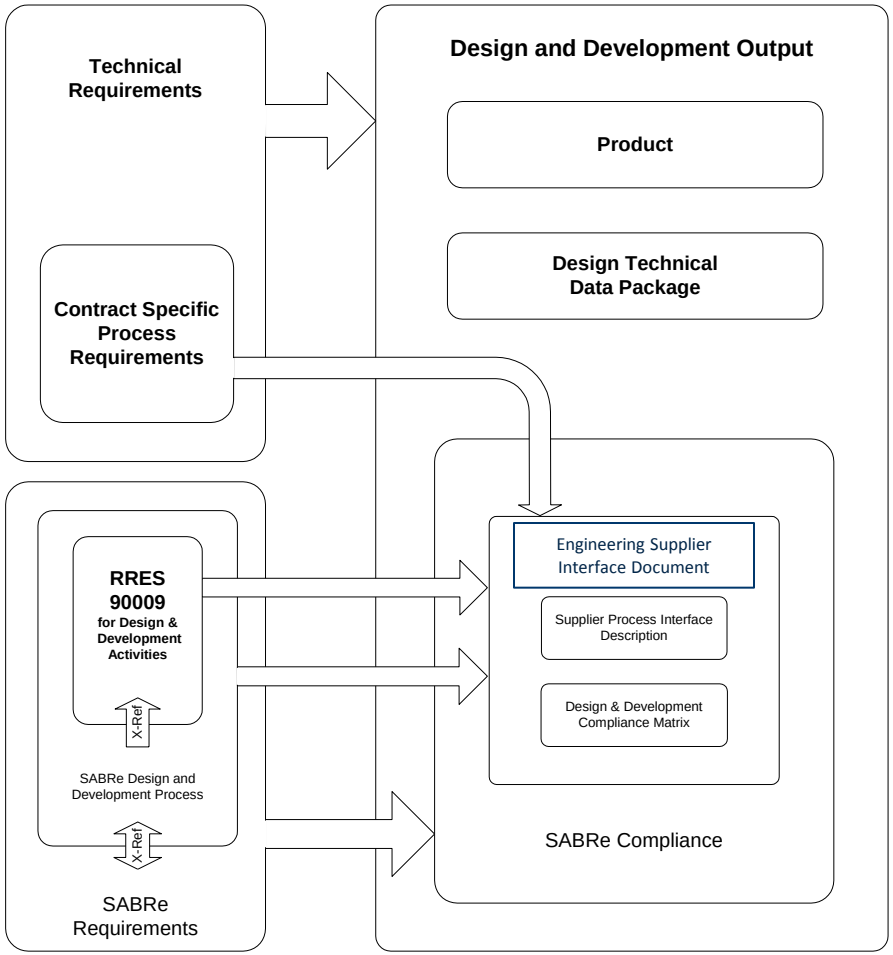
Relationship Diagram

The relationships between the management controls (Requirements, ESID, Compliance Matrix etc), within the scope of the design and development process, are detailed in the relationship diagram.



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RRES 90009

RRES 90009 Clause Topic	RRES 90009 ref.
Organisation and Resource Management:	6.1
Programme Management:	6.2
Requirements Management:	6.3.1
Design Methods and Tools:	6.3.2
Technical Reviews:	6.3.3
Design Technical Data:	6.3.4
Product Safety/ Failure Reporting and Corrective Action System (FRACAS):	6.3.5/6.3.25
Sub-tier Approval and Control:	6.3.6
Export Control, Intellectual, and Other Property:	6.3.7
Materials Definition and Control:	6.3.8
Materials and Manufacturing Processes to be avoided:	6.3.9

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RRES 90009

RRES 90009 Clause Topic	RRES 90009 ref.
Control of Special Processes:	6.3.10
Control of Design Changes:	6.3.11
Non-Conformance/ Control of Salvage Schemes:	6.3.12/6.3.13
Design Source Changes/ Engineering Control of Manufacturing Source and Method:	6.3.14 /6.3.15
Component Proving/ Non-Destructive Evaluation:	6.3.16/6.3.17
Supplier Use of Finished Parts:	6.3.18
Serialisation of Parts:	6.3.20
Repair Schemes:	6.3.21
Document and Data Retention:	6.3.22
Disposal:	6.3.23
Configuration Control:	6.3.24
Service Bulletins:	6.3.26
Design Verification:	6.4
Certification Testing:	6.4.6
Acceptance Testing	6.4.7

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