1.0 Purpose/Scope

1.1 Purpose

The purpose of this document is to provide information and guidelines to the supplier for the clear understanding of the FAI process used at RDA. It also outline the requirements that are to be met in order to enable FAI Approval and the successful release of the products into serial production.

1.2 Scope

This guidelines shall be followed by all suppliers approved by Rheinmetall Defence Australia (RDA) who have a current Purchase Order (PO) with FAI requirements defined. This is also applicable for organizations responsible for producing the design characteristics of the product (= product realization). FAI is applicable to assemblies, sub-assemblies and single parts, as well as for modifications to Commercially-Off-The-Shelf (COTS) products.

2.0 Definitions

COTS	Commercially Off The Shelf parts (= catalogue items).
FA	First Articles - parts manufactured with standard production equipment under series conditions, but prior to the start of serial production.
FAI	First Article Inspection – process of planning and performing the verification and documentation that the First Articles are fully compliant with all drawing and technical specifications requirements
FAIR	First Article Inspection Report – a report detailing the FAI findings. The format used by RDA is based on AS9102B which is in common usage in Australia
FAT	Factory Acceptance Test
IGI	Incoming Goods Inspection
PO	Purchase Order
PRR	Production Readiness Review
QSB code	Quality assurance conditions *Qualitätssicherungsbedingungen in German*) – a coding system used by Rheinmetall entities to specify quality assurance conditions that must be satisfied by a supplier. The QSB are noted on the purchase documentation and should be marked on supplier deliveries
RDA	Rheinmetall Defence Australia.
RFQ	Request for Quotation

SAP	Systems Applications and Products in Data Processing (SAP is the Enterprise Resource Planning (ERP) Financial Tool used by RDA)
Special process	A process for production where the resulting output cannot be verified by subsequent monitoring or measurement and for which non-conformities would become apparent only after the product is in use.
SQA	Supplier Quality Assurance – members of the RDA Quality department responsible for assessing and auditing RDA suppliers
SQE	Supplier Quality Engineer
SQM	Supplier Quality Manager
Submission levels	Details the requirements for the FAI and the level of RDA involvement.
TQ	Technical Query = technical questions raised by the supplier during the RFQ, FAI planning or execution phase

3.0 Roles and Responsibilities

Role	Responsibility
Procurement	Procurement team is responsible for communicate the FAI requirements to suppliers, contractual agreement and managing timing plan with delivery in line with Project timeline. Also, supports supplier, with SQE and Engineering, to resolve technical queries, deviation permits & other process issues.
SQM	SQM is accountable for the process as a process owner and has authority to allocate resource and prioritise FAIs in line with Project timeline.
SQE	The Supplier Quality Engineers is responsible for facilitating and coordinating FAI with any RDA staff participation with the supplier. SQE is also responsible for reviewing the FAIR and FA at RDA as required and communicate the outcome to the supplier and internal team. This includes attending the FAI for Level 4 submissions at supplier end.

Supplier	The supplier is responsible to plan and carry out the First Article Inspection, without exception. The supplier is also responsible for providing all documentary or other evidence to confirm the validity of the production process. The supplier remains accountable for the First Article Inspection including, but not limited to, producing additional parts and repeating the inspection process should the FAI be unsuccessful. Finally, the supplier is responsible for maintaining the FAI approval conditions, including notification to RDA in the case of changes in the process that warrant the new FAI approval along with other requirement outlined in the contractual agreement.
IGI	IGI team controls the QSB codes upload and Inspection plans in SAP. IGI support the FAI review at RDA as guided by SQEs and release the parts to the next stage.

4.0 Content

4.1 What is FAI?

4.1.1 First Articles are basically parts manufactured with standard production equipment under series conditions, but prior to the start of serial production.

4.1.2 First Article Inspection is the process of planning and performing the verification and documentation that the First Articles are fully compliant with all drawing and technical specifications requirements.

4.1.3 The supplier is responsible to plan and carry out the First Article Inspection, without exception. The supplier remains accountable for the First Article Inspection including, but not limited to, producing additional parts and repeating the inspection process should the FAI be unsuccessful.

4.1.4 RDA is responsible for providing the FAI requirements, required timing as well as the technical documentation defining the part and requirements to be met.

4.1.5 RDA will provide guidance and coaching if required in order to support the supplier in achieving a positive outcome from the FAI.

4.1.6 Purpose of the First Article Inspection (FAI)

4.2 The purpose of a First Article Inspection is to:

4.2.1 Provide objective evidence that all engineering design and specification requirements are properly understood, and achievable as per drawing.

4.2.2 Verify the documented evidence by the supplier to confirm that the requirements have been understood and are achievable consistently by the supplier.

4.2.3 To set a process between the supplier and RDA for the approval/release of the production processes and the first article of purchased parts/components;

4.2.4 Verify the supplier's/manufacturer's quality capability; Verify that all processes, tools and equipment used in series production meet the manufacturer's required product quality.

The benefits of performing a First Article Inspection are;

4.2.5 Reduce the potential risks at start of production or process changes;

4.2.6 Avoidance of systematic errors and ensuring that drawing and specifications are compiled;

4.2.7 Avoidance of deviations and reworking during series production;

4.2.8 Creation of a First Article as a reference in the event of deviations from the serial part;

4.2.9 Supports the release decision for series production (= approval to start serial production).

4.3 When is FAI Required?

4.3.1 FAI is required for all new parts before the series production can start, except in the following cases and unless otherwise specified by the RDA:

4.3.2 Development and prototype parts that are not considered part of the first production run.

4.3.3 Unique single run production orders, not intended for ongoing production.

4.3.4 Commercially-Off-The-Shelf (COTS) or Military-Off-The-Shelf (MOTS) parts (= catalogue items).

4.3.5 Indirect products and services (= products and services that do not go into a vehicle or product supplied by RDA).

4.3.6 If the supplier already has a valid FAI approval from RDA for the part and maintained the FAI approval conditions.

FAI may be repeated when the any of the following occur:

4.3.7 Change of the product design (revision change or change in form / fit / function).

4.3.8 Change in the manufacturing process.

4.3.9 Use of new machine or equipment, new tooling or tooling subjected to extensive modification or repair (this includes part specific jigs, fixtures and test equipment).

4.3.10 Changes in the materials or components used.

4.3.11 Change of suppliers of material or components, as well as subcontractors.

4.3.12 Relocation of the production facility (including fixed machine movements within the same buildings).

4.3.13 Interruption of production over a period longer than 24 months.

4.3.14 In response to a non-conformity from an earlier sample or series production when requested by RDA.

4.3.15 At special request of RDA.

Note: If any of these above changes are foreseen or occurred, the supplier must notify RDA Procurement team as soon as possible and ideally at least 3 months before the planned change implementation. A collaborative review will then occur to decide as to whether an FAI is required (based on risk and assurance assessments), and to what level the potential FAI is required to be performed.)

4.4 FAI levels

4.4.1 There are several FAI levels and the required FAI level is decided by RDA based on a risk analysis ((e.g. complexity of the part or technology, characteristics to be controlled, special characteristics).

4.4.2 The FAI level required for the parts is documented on the RDA Purchase Order for each specific part (using QSB codes 206 to 209). The 4 levels are described below:

4.4.3 Level 1 – QSB code 206: self-approval. The execution of the First Article Inspection is performed by the supplier, as well as the approval. The release (= approval to start series production) happens when the supplier submits the FAIR cover page, with an approved status, to RDA. No further approval will be given from RDA. The supplier shall retain all records of the FAI (full FAIR) and submit it to RDA upon request.

4.4.4 Level 2 – QSB code 207: documentation only. The execution of the First Article Inspection is performed by the supplier. The FAI documentation must be submitted to RDA for review and approval. The release (= approval to start series production) is given by RDA upon successful review of the FAIR report.

4.4.5 Level 3 – QSB code 208: full sampling. The execution of the First Article Inspection is performed by the supplier. The complete documentation as well as the First Articles must be submitted to RDA for review and approval. The release (= approval to start series production) is given by RDA upon successful review of the FAIR report and FA samples.

4.4.6 Level 4 – QSB code 209: on-site attendance. The supplier must notify RDA Procurement and SQA at least 14 days before the planned execution of the FAI. The supplier has to provide the FAIR before the on-site review, based on what RDA will organize with the supplier for attending the FAI. The supplier is responsible to perform the FAI with RDA attendance. The complete documentation as well as the First Articles must be submitted to RDA for review and approval (can be done onsite at the supplier). The release (= approval to start series production) is given by RDA upon successful review of the FAIR and FA samples, as well as based on the onsite review. In some cases, depending on the complexity and criticality of the parts or assemblies, RDA may conduct a Production Readiness Review (PRR) in order to assess the supplier's readiness to start production and prepare for the FAI submission to RDA. This will be discussed and agreed with the supplier during the FAI planning stage.

Note: When physical attendance of RDA personnel is not feasible, RDA may negotiate with the supplier for virtual attendance. The decision to attend the FAI virtually should be based on risk and prevailing operational and environmental considerations

4.5 Pre-requisites to FAI

4.5.1 In order to carry out a First Article Inspection, there are a number of pre-requisites required to ensure the best possible outcome.

4.5.2 The full technical documentation package must be available from RDA. This includes any components or materials with a specified source as well as internal standards.

4.5.3 The deadline for completion of the FAI must communicated from RDA and the actual FAI timing agreed with the supplier as soon as the FAI requirements are confirmed by RDA, ideally before the PO is placed.

4.5.4 In order to satisfy its due diligence as well as the clause 8.2.3 “Review of the requirements for products and services” from ISO 9001:2015 and AS 9100:D, the supplier must perform a detailed review and feasibility study of all the requirements, technical and non-technical, and make sure it seeks and receives the necessary clarifications from RDA. This must happen as soon as the technical documentation is available, and must take place during the RFQ/quotation phase.

4.5.5 In the case of (permanent) changes requested, the change requests should be submitted to RDA and approved before the First Article Inspection takes place.

4.5.6 In the case of temporary deviations (for example a temporary technical deviation from the specifications or the use of a temporary extra process), the supplier must submit the deviation request to RDA as soon as possible. Approved deviation requests are required to perform the FAI. In the case of pending deviation requests, a First Article Inspection cannot be performed.

4.6 FAI Process

The supplier is responsible for their FAI activities in three phase’s namely planning, evaluation and documentation (FAIR submission)

4.7 FAI planning phase

This phase occurs after the FAI requirement and PO confirmation has been received from RDA.

4.7.1 The supplier must plan all the activities to be performed throughout the FAI process and before the first production run. This planning should be coordinated with RDA in case of an FAI level 4 – with RDA on-site attendance.

4.7.2 The determination of the design characteristics inspection and their sequence in order to cover the characteristics not measurable on the final product.

4.7.3 Extraction of the design characteristics from the Digital Product Definition (DPD), like 3D models, that are not fully defined on 2D drawings including nominal dimensions and associated tolerances.

4.7.4 Determination of the evidence to be included in the FAIR for each design characteristic.

4.7.5 Determination that approved special processes (like welding), laboratories, materials and customer directed sources are identified, as applicable, and that the manufacturing planning, routing and purchase document calls out the correct specification and relevant sources.

4.7.6 Determination that the key characteristics are identified, if applicable.

4.7.7 Determination if part specific tooling, gauge and fixture are required. These should be identified, qualified and traceable as appropriate.

4.7.8 Notification to RDA 14 days prior in case of RDA’s attendance required for performing the FAI onsite with supplier.

4.7.9 The procurement of the materials and components required for the FA manufacturing.

4.7.10 The submission of the FAIR to the RDA for review and approval and release.

4.8 FAI evaluation phase

The critical phase of the FAI process is the manufacturing of the FA together with their careful evaluation as defined during the planning phase. During the product realization, the supplier must perform the following activities, when applicable, to ensure conformance with design characteristics:

4.8.1 Review documentation for the manufacturing process (routing sheets, quality plans, and work instructions) to ensure all operations have been completed and call out for the correct specification, material types, conditions and approvals.

4.8.2 Review the supporting documentation in the FAI (inspection data, test data, Acceptance Test Procedures, special process approvals and certifications) for completeness.

4.8.3 Verify that the raw material and special process certifications call out for the correct specification, material types, conditions and approvals.

4.8.4 Verify that the customer directed/approved sources are used (i.e. directed supplier).

4.8.5 If applicable, review the non-conformance documentation included in the FAIR for completeness.

4.8.6 Verify that the required tooling have been used and is appropriately documented on form 3.

4.8.7 First Article Inspection are to be carried out with appropriate measurement tools. Based on Measurement System Analysis (MSA) a measurement tool should be at least 10 times as accurate as the tolerance of characteristic to be measured.

4.8.8 Verify that every single design characteristic requirement is accounted for, uniquely identified (e.g. via ballooned drawing) and has inspection results documented on form 3.

4.8.9 If applicable, verify that the part marking is legible, correct in content and size and properly located in line with specification.

Note: Upon request from RDA (FAI level 4), one or more RDA representative may attend the First Article manufacturing and/or First Article Inspection activities on-site at the supplier's premises for evaluation of FAI.

4.9 Handling of non-conformances

4.9.1 If non-conformances have been identified during the product manufacturing or inspection, these non-conformances must be documented in the FAIR. The form 1 must be filled in and it shall be noted as "not complete".

4.9.2 The non-conforming design characteristic must be recorded on form 3 with the non-conformance document number (NCR) referenced.

4.9.3 The supplier must then implement corrective actions and perform a partial FAI for all non-conforming characteristics on the next production run, after implementation of the corrective actions.

4.9.4 This process is to be repeated until the non-conformances have been closed and the non-conforming design characteristics are conforming.

4.10 FA marking

The First Article unit(s) shall be separately marked with tags, labels or adhesive tape showing the following details: Refer attachment for example

4.10.1 The mention ‘FIRST ARTICLE”

4.10.2 Part/material number and revision.

4.10.3 Drawing number and revision.

4.10.4 Part name.

4.10.5 Order number.

4.10.6 FAIR number.

4.10.7 Supplier name.

Similar marking should be applied on the packaging in order to facilitate identification of the First Articles upon receipt.

4.11 FAI Report

4.11.1 The last phase of the FAI is to gather and summarize all evidences previously recorded during the FA manufacturing and inspection.

4.11.2 The content of the FAIR is defined in the FAI table of content, and is dependent of the FAI level requested by RDA.

4.11.3 For RDA, the content of the FAIR consists in:

4.11.4 FAI cover page filled in, with the FAI status (approval, conditional approval or rejected) from the supplier’s FAI, and the necessary signatures.

4.11.5 FAI table of content completed as required.

4.11.6 FAI form 1 – Part number accountability. Used to identify the FAI part and associated sub-assemblies.

4.11.7 FAI form 2 – Material accountability. Used for material, special processes or functional testing required by the specifications

4.11.8 FAI form 3 – Characteristics accountability. Used to record measurements and inspection/verification of each characteristic detailed in the specifications and/or drawing

4.11.9 Supporting documentation, referred to in the previous forms, to demonstrate compliance to design characteristics. For example, a supplier’s material certificate, referred to on form 2, linking the First Articles to a batch/heat number from the mill.

4.11.10 The FAIR template contains an instruction page, listing the items required to be part of the FAIR. This page does not have to be part of the final FAIR.

Note: It is acceptable to have continuation sheets and insertion of additional rows.

4.11.11 The documents must be completed in English language and can be filled in either electronically or in permanent ink (clearly legible).

4.11.12 The ultimate purpose of the FAIR is to demonstrate to RDA that the First Articles meet all technical requirements, and continued serial production will as well.

4.11.13 Guidance on what evidence can be gathered during the FAI to document in the FAIR:

4.11.14 Raw materials: raw materials will, in most case, be specified by RDA. A typical evidence to demonstrate that the correct materials are used are certificates of conformance from the suppliers. This can be a material certificate from the mill for steels for example, or certificates of conformance for hardware like bolts and nuts, stating the standards, class and surface treatments.

4.11.15 Conversion/manufacturing processes: the dimensional report (summary of all measurements from the drawing, standards or specification sheets) is the common way to demonstrate a part's compliance with the drawing's requirements.

4.11.16 Special processes: RDA may specify special process requirements, for example on welding, cleaning or bending. Whilst some characteristics generated by these processes can be inspected/measured after the facts, there are a number of specifications that cannot be tested afterwards. The required evidence expected for these processes include certificates of conformity, third party certifications as well as records of in-process inspection.

4.11.17 Functional testing: RDA might also require test procedures to be followed by the suppliers to demonstrate functional testing. Test results, in the form of a test report or a completed test checklist, are a typical evidence for functional tests.

4.12 FAI submission to RDA and approval

4.12.1 Once the FAIR is complete, it can then be signed by the relevant quality authority at the supplier and submitted to RDA for review and approval.

4.12.2 RDA will conduct a detailed review of the FAIR and review the First Articles (in case these were requested).

4.12.3 RDA will provide feedback on the FAI acceptance within 15 calendar days from the delivery of the FAIR (and FA if applicable). If RDA requires more than 15 days, it will notify the supplier and provide an estimation of time to issue acceptance or rejection of the FAI.

4.12.4 If a decision is not received from RDA within 15 days, this does not constitute acceptance for the FAI.

4.12.5 RDA may request more information to be provided in order to make a decision.

4.12.6 The decision made on the FAI can be as follows:

4.12.7 FAI approval: once RDA approves the FAI, it will do so by signing off the FAIR cover page and sending it to the supplier's quality representative. RDA will then issue an order to ship series production if appropriate.

4.12.8 FAI conditional approval: if the part does not fully meet the specifications or if some information is missing, RDA may grant a conditional FAI approval to the supplier. This will allow the supplier to start serial production and supply production parts to RDA, under the condition that a new FAI, full or partial, be performed on the next production batch, or as soon as the causes of the discrepancy have been addressed. (Conditional Approvals generally are provided for up to 6 months, longer Conditional Approvals require RDA senior design authority endorsement.)

4.12.9 FAI rejection: If the FAIR is incomplete (information missing) and does not allow RDA to confidently assess that the FA meet all technical requirements, RDA will reject the FAI by signing off the cover page of the FAIR with the "rejected" status and returning it to the supplier. If the First Article part was submitted to RDA, the supplier and RDA will agree on the best way to dispose of these parts (either accept under deviation, rework, scrap or return to the supplier).

4.12.10 The supplier shall maintain records of all FAI documentation as well as FAI approval from RDA for at least the duration the parts are in serial production and in accordance with statutory regulations and with contract requirements.

4.13 Failure to submit a FAI:

4.13.1 If the supplier is unable to submit a FAI as agreed, it must advise RDA as soon as possible in writing and seek for direction.

4.13.2 Failure to submit a FAI as per the agreed terms (e.g. as per the timing previously requested and agreed, or as per FAI submission level) must be notified to RDA as soon as possible, with a proposed alternative (e.g. new date for submission).

4.13.3 Failure to submit a FAI to RDA will be dealt with as per the contractual agreement between the supplier and RDA. This includes a Management Meeting and potentially a supply sourcing review.

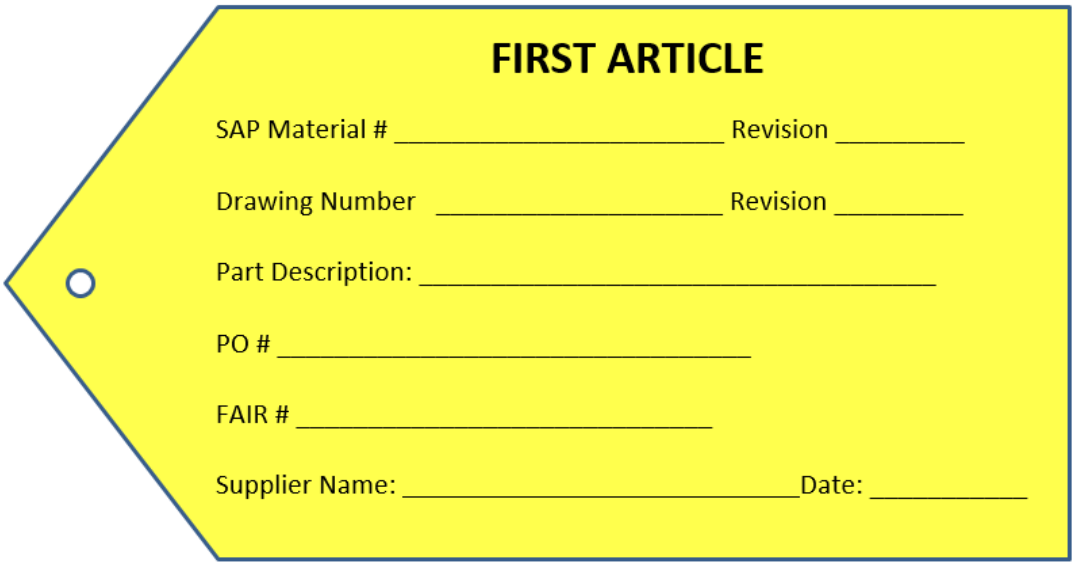
4.14 Failure to get a FAI approval/release from RDA:

4.14.1 If a FAI submitted by the supplier is rejected by RDA, the supplier is not authorized to start serial production until an approved FAI can be achieved and release is given by RDA. If, after several occurrences, the supplier is not able to pass a FAI successfully, the supplier and RDA will agree on a way forward in order to achieve the required outcome for RDA.

4.14.2 Failure to reach a mutual agreement with RDA will be dealt with as per the contractual agreement between the supplier and RDA. This includes a Management Meeting and potentially a supply sourcing review.

5.0 Attachments

5.1 First Article Identification Tag



6.0 Associated Documents

Associated documents are available in the general information section [*i*].

Other Documents:

- AS9102B / DIN EN 9102:2015: First article inspection requirements. This is the main FAI standard and is the basis for this document.
- AS9100 / EN 9100: Quality management systems, requirements for aviation, space and defence organizations.
- Supply Chain Management Handbook (SCMH) from the International Aerospace Quality Group (IAQG), section 3.2: First Article Inspection (FAI).

7.0 Revisions

Revision	Description	Date
1.0	Initial Release	03/09/2021
2.0	RIMS Conversion and First Release	31/10/2021
3.0	Added a submission level and QSB code 207, minor corrections	20/07/2022
4.0	Updated to be in line with revised FAI Procedure and Forms, attachment included for example of First article identification tag.	27/09/2023
5.0	Converted to external template	23/04/2024
6.0	Added measurement tool requirement	01/07/2024