

Q2A – First Article Inspection (FAI) – AS9102

* Revised ** Added

NOTE: A hard copy of this document may not be the document currently in effect. The current version is always the version on the Lockheed Martin network.

The terms “Item” (plural “Items”), “PO”, “Buyer”, and “Seller” used herein shall have the same meaning as the terms “Work”, “Contract”, “LOCKHEED MARTIN”, and “SELLER”, respectively, as may be defined in another provision of the Purchase Order (“the PO”) of which this Quality Clause Q2A is a part.

SCOPE:

First Article Inspection is defined as a verification of two key elements:

- Conformance to all engineering requirements
- Demonstration of stable, repeatable processes

DEFINITION:

FIRST ARTICLE INSPECTION PLANNING

First Article Inspection (FAI) planning prior to first production run parts. FAI Planning typically involves:

- Activities to be performed throughout the First Article Inspection process and the responsible organizations for those activities
- Design characteristics¹ to be verified
- Digital Product Definition (DPD) design characteristics required for product realization, not fully defined on 2D drawing, are extracted from DPD including tolerances for nominal dimensions.
- Determining what specific evidence of design characteristics are to be included in the FAI
- Ensuring approved Special Process, laboratory, and material sources are used (as applicable), and the applicable manufacturing, planning, routing, and purchasing documents call out the correct specifications
- Key Characteristics are identified and Critical Item requirements are met, as applicable (see AS9103 for guidance on Key Characteristics)
- Part specific gages and tooling are qualified and traceable, as applicable
- Decisions on whether changes in the process require an updated FAI

First Production Run parts: The first group of one or more parts that are the result of a planned process designed to be used for future production of these same parts.

Digital Product Definition (DPD): Requirements of any digital data files that disclose (directly or by reference) the physical or functional requirements, including data files that disclose the design or acceptance criteria (e.g., 3D model, solid, etc.)

GENERAL REQUIREMENTS:

- A. All elements of this clause are applicable to the PO line item(s) referenced on Buyer's PO. Any lower-level detail parts which comprise the top level PO line item (if applicable) will comply with the First Article Inspection requirements as stated in AS9102. Seller may obtain copies of AS9102 from the Society of Automotive Engineers at: www.sae.org. Forms can be obtained at: <http://www.sae.org/aaqg/publications/AS9102-faq.htm>. References to AS9102 in this document refer to the revision in effect at the time of the PO, or Seller may work to a more current version of AS9102, if desired, at no additional cost, price, or fee of the PO.

NOTE: F-35 Program Teammates BAE and NGC shall perform FAIs in accordance with AS 9102, including flow down of AS9102 for procured products, except those that meet the requirements of Paragraph J.

- B. Buyer reserves the right to require Seller to perform an FAI, at Buyer's request, at no additional cost, price, or fee of the PO.
- C. Seller shall document completion of the FAI in the English language.
- D. All elements of this clause are applicable to the Seller's facility address referenced on Buyer's PO. If Seller's Item manufacture, processing, acceptance, and shipment will be performed at or from a location other than the contracted PO address, the entrance / exit requirements outlined below must flow to those sub-tiers suppliers and/or manufacturing sites.
- E. For "Buyer-Designed Items", Sellers procuring or manufacturing Items requiring AS9102 compliance shall contact Buyer's assigned Supplier Quality Engineer a minimum of 5 days prior to Seller procuring Items or beginning any manufacturing activity for the PO. Buyer's assigned Supplier Quality Engineer may elect to review or participate in Seller's FAI process at any time throughout the FAI process based on the complexity/criticality of the Item and Seller's performance to Buyer's requirements.
- F. Distributors that procure Buyer-designed Items shall ensure that the manufacturer has performed FAI and that documentation is available upon request.
- G. For "Seller-Designed" Items associated with Buyer-released engineering definition (i.e. Buyer Source Control Drawing, Buyer Specification Control Drawing, Seller Interface Control Drawing), Seller, at a minimum, shall meet Buyer's FAI requirements. Seller shall document the results in the FAI report. Buyer shall have the right to request additional verification of the FAI process as may be required by Buyer's Program or other quality requirements. Seller shall contact Buyer's assigned Supplier Quality Engineer a minimum of 5 days prior to Seller procuring Items or beginning any manufacturing activity for the PO. Buyer's assigned Supplier Quality Engineer shall participate in the FAI process at any time from inception until the FAI is complete. The degree of Buyer's Supplier Quality Engineer participation will be dependent on the complexity/criticality of the Item and Seller's performance to Buyer's requirements.
- H. If and when Seller incorporates any engineering change (including special processing, software, or firmware) that has the potential to affect form, fit, function, safety, or reliability, Seller, without further direction from Buyer, shall perform partial or full FAI as required by AS9102. Seller shall perform partial or full FAI, at no increase in the cost, price, or fee of the

PO, to ensure that the changes have had no adverse effect on Items delivered under the PO. This partial or full FAI requirement also includes changes to non-deliverable software and revisions in programming used in numerical controlled machines, test stations, coordinated measuring equipment, etc.

NOTE: Paragraph H augments the requirements of AS9102.

Seller shall adhere to the requirements of Paragraph H and AS9102, which require the performance of a full or partial FAI when any of the following events occur:

1. A change in design affecting fit, form, or function of the part.
 2. A change in manufacturing source(s), processing source(s), process(es), inspection method(s), location of manufacture, tooling, or materials, that can potentially affect fit, form, or function.
 3. A change in numerical control program or translation to another media that can potentially affect fit, form, or function.
 4. A natural or man-made event, which may adversely affect the manufacturing process.
 5. A lapse in production for two years or as specified by the Customer (reference Para. B).
- I. Seller shall notify Buyer's assigned Supplier Quality Engineer a minimum of 5 days prior to creating or starting any changes identified in paragraph H above or in AS9102 that affect Items delivered under the PO. Seller shall submit documentation of complete or partial FAIs accomplished as a result of such changes to Buyer's assigned Supplier Quality Engineer.
- J. The following Items shall not require FAI, unless otherwise directed by Buyer:
1. Standard hardware and electronic piece parts (AN, MS standard hardware, etc.),
 2. Commercial Off-the-Shelf ("COTS") Items,
 3. Metallic (plate, bar, rod, etc.) and non-metallic (paints, sealants, adhesives, etc.) raw materials,
 4. Engineering models, design/concept prototypes, etc.,
 5. Items that have been manufactured and delivered to the U.S. Government where Seller has objective evidence of either:
 - a. an FAI performed for the U.S. Government, within the past two (2) years from date of the PO, to the same configuration as required by the PO,
 - b. Documented U.S. Government acceptance, within the past two (2) years from date of the PO, to the same configuration as required by the PO,
 6. Items that have been returned by Buyer for repair,
 7. Items procured to Buyer's part number where Buyer has not developed drawings and/or specifications controlling the Item's physical and functional requirements, or
 - * 8. F-35 Program major aircraft assemblies such as wings, forward, center, tails, and aft sections are not subject to FAI, but product verification tools and practices shall be conducted to ensure conformance to the engineering and integrity of build processes. The minimum requirements for this level of product verification are defined in section Q, below. This clause does not exclude the constituent detail parts and small sub-assemblies from full AS9102 FAI requirements, regardless of the source of supply. (e.g. in-sourced or out-sourced)
 - * 9. C-130 Program major aircraft assemblies to include mid-fuselage panels, forward/aft plug panels, spare center wing assemblies, and the empennage sections are not subject to FAI, but product verification tools and practices shall be conducted to ensure conformance to the

engineering and integrity of build processes. The minimum requirements for this level of product verification are defined in section Q, below. This clause does not exclude the constituent detail parts and small sub-assemblies from full AS9102 FAI requirements, regardless of the source of supply. (e.g. in-sourced or out-sourced)

- K. Seller shall ensure that discrepancies and non-conformances, if any, discovered during the FAI are documented and dispositioned by the appropriate Material Review Board ("MRB") actions; (i.e., Seller's MRB for Seller's design and Buyer's MRB for Buyer's design).
- L. Seller shall comply with the forms usage and completion requirements stated in AS9102. Seller shall complete all fields, but may mark a field as not applicable by indicating "N/A", if appropriate.
- M. For subsequent lots, Seller shall present FAI documentation records for validation to Buyer's assigned Supplier Quality Engineer, if requested by such Supplier Quality Engineer.
- N. Seller shall maintain documentation of FAI results on each deliverable end Item for the period specified by the PO. Seller shall provide to Buyer, within 48 hours of a request by Buyer, a complete copy of FAI reports at no increase in the cost, price, or fee of the PO.
- O. Seller may use the latest revision of Quality Clause Q2A to meet FAI requirements in any other PO with prior versions of Quality Clause Q2A imposed between Buyer, acting for and through Lockheed Martin Aeronautics Company, and Seller, provided that Seller does so at no increase in price, cost, or fee of the PO.
- P. Once AS9102 forms have been completed for one (1) part, Seller shall use internal processes / procedures, as defined in Seller's Quality Management System, to verify product conformance to the FAI Exit Criteria requirement of Q2A (5 Items for Buyer-designed or 2 Items for Seller-designed).
- ** Q. For major aircraft assemblies excluded from AS9102 FAI requirements in sections J.8 and J.9 above, the following minimum requirements for product verification tools and practices shall be performed by Seller and validated by Buyer. This verification, also known as "Product Process Verification (PPV)", shall provide objective evidence that all engineering, manufacturing plans, tooling, training, planning, and supporting documentation, are correctly understood, accounted for, verified, and function together to enable production of repeatable and compliant product.
 - 1. All characteristics from detailed engineering drawings shall be accounted for in operations planning. The method of documentation for this reconciliation should follow the best practice of "ballooning" the drawing and providing traceability of each characteristic to an applicable operations card.
 - 2. All applicable LM Aero specifications, including embedded specification requirements referenced within parent specifications, shall be reviewed using a compliance matrix approach to identify applicable requirements. These requirements shall be subsequently mapped and reconciled to each applicable operation planning card to ensure no requirements have been overlooked in the planning.
 - 3. Reconcile engineering bill of material against released configuration effective at the time of PO acceptance.
 - 4. FAIs for all detail parts and applicable small sub-assemblies shall be validated as complete and conforming.

5. Review documentation (routing sheets, manufacturing/quality plans, manufacturing work instructions, engineering, etc.) to ensure operations are planned with the appropriate level of detail and clarity. Planning review should include Production and Inspection steps.
6. Verify that approved Special Process sources are used (as applicable) and the manufacturing planning/routing documents call out correct specifications and planning/routing documents should contain sufficient detail to ensure compliance to specifications.
7. Verify employee certifications required to perform all tasks listed in operation cards (Planning) are identified and appropriately managed through Seller's quality system.
8. Verify that Key Characteristics and/or Critical-To-Quality requirements have been identified, as applicable, and that adequate measurement and documentation plans are in place.
9. Verify design characteristic requirements are identified and have inspections traceable to each identifier.
10. Verify part specific gages and tooling used as media of acceptance are called out in the planning, as applicable, and are enrolled in Seller's calibration recall system.
11. All tooling used as media of acceptance shall be verified against the applicable requirements of engineering, master tooling, etc.
12. Verify that all dimensioned characteristics not accepted with special tooling as media of acceptance have appropriate measurement and/or sampling plans.
13. Successful fit check, accomplished at the aircraft assembly level.
14. Implement and validate any/all corrective actions resulting from non-conformances identified on the initial production unit.

After accomplishment of this verification on the first component build, all planning, tooling, media of acceptance, and other means of production shall be managed under Seller's configuration control process. All operations will continue to be monitored for any changes or events that potentially alter the validated production system.

DETAILED REQUIREMENTS:

FAI Entrance Criteria

- A. Buyer-designed items: FAI documentation requirements (AS9102 forms or equivalent) begin once FAI planning is complete and production of deliverable parts begins with released, baseline engineering. Only one FAI report (AS9102 forms or equivalent) will be required.

Note: Exceptions or deferrals will be per Buyer's direction.

- B. Seller-designed items: FAI documentation requirements (AS9102 forms or equivalent) begin once FAI planning is complete and production of deliverable parts begins with released baseline engineering, approved Acceptance Test Procedure(s)(ATP), or approved variances (i.e., for yet to be approved ATPs) and Buyer's Supplier Quality Engineer has been notified. Only one FAI report (AS9102 forms or equivalent) will be required.

Note: Exceptions or deferrals will be per Buyer's direction.

FAI Exit CriteriaA. **Buyer-designed items:** FAI will be declared complete upon:

- Manufacturing of a minimum of (6) consecutive parts,
- Internal rework quantities not to exceed 66 internal rework defects per thousand inspection points,
- Initiation of no more than two (2) Seller-responsible SQAR documents requiring MRB action for the minimum (6) consecutive parts,
- Completion of the FAI report created during the FAI Entrance phase,
- Documented evidence of adherence to PM-5010 "Supplier/Seller Shipping Instructions" and PM-801 "Seller Packaging, Handling, Storage and Transportability Instructions for Direct Shipment of Items to the U.S. Government via Wide Area Work Flow" (when applicable), and
- Documented evidence of adherence to Appendix QJ, including plans for validating conformance of Special Processes performed in-house or subcontracted.

Note: Exceptions or deferrals will be per Buyer's direction.

B. **Seller-designed items:** FAI will be declared complete upon:

- Validation of each element of the applicable time-bound FAI package (to include process controls for key parameters) with supporting objective evidence,
- Completion of Safety of Flight and Qualification, with no variances existing for the purchased part,
- Successful completion of first-pass final ATPs for item / system on (3) consecutive production units,
- Completed sub-tier FAI documentation, as applicable,
- Validation of sub-tier assembly/detail FAI(s) with supporting objective evidence, including validation of conformance of subcontracted Special Processes,
- Completion of the FAI report created during the FAI Entrance phase, and
- Documented evidence of adherence to PM-5010 "Supplier/Seller Shipping Instructions" and PM-801 "Seller Packaging, Handling, Storage and Transportability Instructions for Direct Shipment of Items to the U.S. Government via Wide Area Work Flow" (when applicable).

Note: Exceptions or deferrals will be per Buyer's direction.