Introduction: FAQs Updated 19 February 2015

The 9102 standard is used to standardize the documentation of First Article Inspection (FAI) in aviation, space, and defense. The standard covers processes from manufacturing small electrical components to large structural assemblies. The standard does not cover every instance that may arise within an organization or how the organization is to comply with the requirements. The answers below are to questions about the standard that many organizations have struggled with. While these questions provide guidance, an organization should document their FAI process with interpretations or unique circumstances that apply to the organization. The documented process should be reviewed with customer or flowed down to the suppliers as necessary.

I1. Question
What is the value of the FAI process?

I1. Response
The value of the First Article Inspection is to validate that the product realization processes are capable of producing parts and assemblies that meet engineering, design requirements.
The Intent of First Article Inspection is to:

- Reduce future escapes, risks, and total costs
- Help ensure safety of flight
- Improve Quality, Delivery, and Customer Satisfaction
- Reduce costs and production delays associated with product non-conformances
- Identify non-capable production realization processes, initiate and validate corrective actions

A well planned and executed FAI will provide objective evidence that the manufacturer's processes can produce compliant product and that they have understood and incorporated requirements.
First Article Inspection (FAI) will:

- Provide confidence that the processes are capable of producing conforming product
- Demonstrate that the manufacturers of the product have an understanding of requirements
- Provide objective evidence of process capability as defined in this standard
- Provide assurance of product conformance at the start of series production and after changes as outlined in this standard.
- Reduce potential risks associated with production startup and process changes

Linkage to other IAQG FAI documents:

I2. Question
When should an organization begin the First Article Inspection Process?

I2. Response
The Organization should have a process to plan for completion of First Article Inspection, or should plan First Article Inspection activities prior to the First Production Run. FAI planning should address the activities to be performed throughout the First Article Inspection process and the responsible organizations for those activities.

I3. Question
What steps are critical to developing a good first article?

I3. Response
The organization should consider the following activities during FAI planning, and if required, coordinate planning with customer.

A. Determination of Design Characteristic inspection and sequencing for inspection of characteristics not measurable in the final product.
B. Extraction of DPD (Digital Product Design) Characteristics required for product realization that are not fully defined on 2D drawing, from DPD, including tolerances for nominal dimensions.
C. Determination of objective evidence to be included in the FAIR for each Design Characteristic.

D. Determination that approved Special Process, laboratory, material sources, and customer required sources are identified (as applicable), and that the manufacturing planning, routing and purchasing document calls out the correct specification and sources.
E. Determination that Key Characteristic and Critical Item requirements are identified, as applicable (see International Aerospace Standards 9103 or 9100 for guidance).
F. Determination when part specific gages and tooling are required, they are identified, qualified and traceable, as applicable.
G. Provide for customer FAI review, if required.
H. Events requiring an updated FAI

I4. Question
The current revision of 9102 does address Digital Product Designs. How is an organization expected to complete FAI if there is no traditional 2D drawing?

I4. Response:
. When design requirements are in a DPD format and traditional 2D drawing information is not available for all applicable design requirements, DPD design characteristics required for product realization should be extracted, verified, and included in the First Article Inspection Report. To complete the FAI the organization should:

- Establish a process to extract the applicable DPD design characteristics.
- Extract the DPD design characteristics required for product realization. The characteristics required to actually manufacture the product must also be inspected, all dimensional characteristics or feature definitions.
- Ensure the production, inspection, and operations requiring verification have been completed as planned to achieve DPD design characteristics.

I5. Question:
Does the IAQG have additional FAI support materials?

I5. Response:
Examples can be found in chapter 3.2 of the SCMH (Supply Chain Management Handbook). The SCMH is posted on the IAQG website. The URL is: http://www.sae.org/iaqg/handbook/scmhtermsofuse.htm

A. Forms Usage

A1. Question:
Are requirements defined as "CR" in the forms (1-3) to be filled only when there is a special requirement from the customer or, always filled when applicable?

A1. Response:
"Special requirement from the customer" is only an example of Conditionally Required (CR) items must be filled in when "applicable". For example, not all parts have a serial number but when they do you must fill in that field (form 1 field 3). The same is true for the other "CR" fields. When not applicable or required by engineering, leave them blank or write N/A.

A2. Question:
What is the condition upon which form 1, field 4, FAIR Number, is required?

A2. Answer:
Field 4 is required when an organization is using a process to produce their FAI that will assign a unique FAIR number to the FAI. This field would not be required when an organization is using paper forms or electronic forms that do not generate a unique FAIR number.

A3. Question:
What is the difference between field 5 and field 7 on form 1?

A3. Answer:
Field 6 of Form 1 is the Drawing Number; this field should have the drawings (including parts list), that contain design characteristics needed for product realization. There may be more than one drawing listed in this field.
Field 7 of Form 1 is the Drawing Revision Level, this would be the revision level of the drawing or DPD set that is listed in field 6. When there is more than one entry in field 6 then the entries in this field need to correspond to the entries in field 6.
Field 5 of Form 1 is the Part Revision Level, this is the revision level that is identified on the part. Not all organizations use a part revision level for tracking configuration.

A4. Question:
What are some examples of entries for form 1, field 9 (required field)?

A4. Response:
The intent is to provide linkage to the planning/router that was used during the manufacture of the FAI part/assembly. Some companies track parts with a production control number and a "router issue number". Production control numbers are usually for cost collection and order tracking and router issue numbers can be directly correlated to the router. You may use anything that provides linkage to the exact router/planning used during FAI.

A5. Question:
Form 1 field 9: Manufacturing Process Reference. Please elaborate on what is required?

A5. Response:
The purpose of field 9 on form 1 is to provide traceability from the FAI part to the router/planning used to manufacture the part. Any number or reference that provides that traceability is acceptable.

A6. Question:
What is the expectation for field 18 when the organization does not have a supplier's FAIR number?

A6. Answer:
When an organization does not have the supplier’s FAIR number because it does not exist or is not stored to where the organization has access to view the supplier’s FAIR when performing their own FAIR, then FAIR number would not be required. When a supplier FAIR number is documented in field 4 of the supplier FAI and the organization has access to view the number when performing the next level FAI then it would be required to be added to the organization’s FAI.

A7. Question:
Are the forms in the standard examples or are they mandatory?

A7. Response:
You may create your own forms but they must require the same information as the forms provided and must be numbered with the same field numbers. See 4.7.1.c..... Forms other than those contained in the Appendix may be used; however they must contain all "Required" and "Conditionally Required" information and have the same field reference numbers.

A8. Question:
Can parts lists, reports and other records be noted on the forms and attached rather than copying all the data onto the forms?

A8. Response:
Yes, you may reference the attachments on the forms and attach parts lists, reports etc. You may also attach drawings to form 3 and note the drawing on the form as long as the characteristics and results are clearly identified

on the drawing. Any efficient, time saving method is acceptable but you must maintain clear traceability and the data on the attachments must be verified.
When automated inspection tooling produces measurement results, those results may be referenced on form 3, identified as pass/fail, and attached when:

- The characteristic numbers on form 3 are clearly linked in the attached report
- The results in the attached reports are clearly traceable to the characteristic numbers on form 3.
- The results are directly comparable to the Design Characteristic. E.g., coordinate data alone would not be acceptable for a positional tolerance; the results should show the actual positional value.

A9. Question:
How should multiple pages of forms be numbered?

A9. Response:
Each form is to numbered independent of the others. The reason for three forms is that in some companies, different people or organizations fill out the different forms. It is acceptable to combine them.

A10. Question:
Can an electronic signature be used in field 19 of form 1?

A10. Response:
An electronic signature is acceptable as long as it is acceptable within your Quality management system. The Quality management system must define electronic signature usage and control.

A11. Question:
Form 1 field 14 - What does baseline mean?

A11. Response:
This refers to the previous FAI part number, or approved configuration, including revision level, to which a partial FAI is performed. An example of an approved configuration could be a part produced prior to the requirement of this standard.

A12. Question:
Can a part produced prior to the application of this standard, be a Baseline Part Number without clear evidence of each design characteristic?

A12. Response:
Even if there is no FAIR or detail verification data for each design characteristics (e.g., numerical data), it can be considered a Baseline Part number, as long as the product had already been verified, produced and addressed as conforming product. See Question B9.

A13. Question:
Form 2 field 7 - What should be entered in this field?

A13. Response:
Field 7 on form 2 is an optional field. Some companies have special codes for different processes and require an entry in this field. If you or your customer has no special code, leave the field blank or mark it N/A.

A14. Question:
Form 2 field 8 – Is the supplier name and address required when a supplier code that is adequate for identification is available?

A14. Response:
Yes, the supplier name and address would still be required. The first sentence specifies that the supplier name, address, and the supplier code are required to be entered into the field. The requirement from the first sentence is that all three pieces of information are entered into the field. In the second sentence relief is given for the supplier

code requirement when the supplier code is not available or not adequate for identification. The supplier name and address are always required, but when the supplier code is not available or adequate, then the supplier name and address may be used in place of the supplier name, address and supplier code.

A15. Question:
If using electronic forms and have multiple pages, what fields are required on subsequent pages for each form?

A15. Response:
If you are using electronic forms, you can just add rows and additional sheets won't be required. If you are converting the forms to paper and need additional pages, follow the note at the top of the forms instructions: "NOTE: Fields 1-4 are repeated on all forms for convenience and traceability." Repeat fields 1-4 on each additional sheet.

A16. Question:
What is the purpose of field 14 on form 3?

A16. Response:
Form 3 field 14 is an optional field for the user to add columns and information that are in addition to the requirements of the standard. Since it is optional and at your discretion, you may add columns and titles for those columns as you see fit. You may not rearrange or change any other portion of the form.

A17. Question:
What are "characteristic designators" for form 3 field 7?

A17. Response:
"Characteristic designators" are identified on engineering documents. Applicable design engineering also establishes definitions of those designators (including major/minor characteristics, key characteristics, structural characteristics, etc.). 9102 cannot provide these definitions.

A18. Question:
Where are instructions for filling out the 9102 forms?

A18. Response:
Instructions for completing each field in the 9102 forms are contained within 9102. To comply with the standard, you should have an internal procedure defining your method. You can purchase 9102 in many languages from approved publishers like SAE, SJAC & ASD-STAN.

B. When to Perform an FAI

B1. Question:
When a lapse in production of 2 or more years occurs, is a Full or Partial FAI required?

B1. Response:
A FAI is required for any characteristics that may be impacted by the inactivity. When a full FAI is not preformed, your FAI procedure should describe the rationale for assessing the characteristics that were not affected by the inactivity and how the assessment is documented.

B2. Question:
After an initial FAI is complete, is a supplier required to complete partial FAI's when inspection frequency and methods are changed?

B2. Response:
FAI (Complete/Partial) would be required for the changed inspection when the tool listed on Form 3 field 10 is changed.

B3. Question:
If Manufacturing is moved from one location/facility to another, is a new FAI required?

B3. Response:
9102 - 4.6.f.1 states: A change in manufacturing source(s), process(es), inspection method(s), location of manufacture, tooling or materials, that can potentially affect fit, form or function. The key wording is "potentially affect fit, form or function". If you have good rationale supporting a position that the change doesn't "potentially affect fit, form or function" (and you can convince your customer) an updated FAI is not required. The move distance isn't a factor. Record the reason for Partial FAI on field No.14 of Form 1.

B4. Question:
In4.6.f, there are conditions that require a new or partial FAI when a change occurs "that can potentially affect fit, form or function". How is this assessed?

B4. Response:
The only people able to evaluate these changes for "fit, form or function" are those knowing the product, the processes, the environment and knowing which problems occurred in the past (lessons learned). These people belong to the producer ("the organization" in 9100). You may also be influenced by your customer. Standards provide requirements but cannot provide methods for meeting the requirements. The organization should have a process to determine who is responsible for addressing events requiring an updated FAI.

B5. Question:
Is a partial FAI required for all natural or manmade events that affect the manufacturing process?

B5. Response:
The key wording is “that affect the manufacturing process”. If a company has provisions, such as calibration or recovery procedures, to validate that the equipment is not affected, then an update is not required.

B6. Question:
Can an Assembly FAI be completed when one or more of the detail parts has not completed the FAI process?

B6. Response:
Unless the failed detail FAI affects the fit, form or function of the assembly, the Assembly FAI can be completed if it complies with 9102. The failed detail stands on its own, and it alone requires a FAI in accordance with paragraph 4.4.

B7. Question:
When engineering provides alternates, must the FAI be repeated when the alternate is used?

B7. Response:
A partial or full FAI would generally be required when an alternate is used. The determination of a FAI requirement would depend on your assessment of the potential for affecting fit, form, or function. In cases that determination is made that a FAI is not required, the rationale should be documented.

B8. Question:
When the supplier for a process specified by the drawing is changed, must the FAI be redone?

B8. Response:
Yes, you or your new supplier must perform a partial FAI covering the processes/characteristics moved. Moving to a new supplier provides the "Potential" to affect fit, form or function. Also see answer to question B3.

B9. Question:
If a baseline FAI exists but is to a system used prior to 9102, must the baseline FAI be updated to 9102 prior to performing a new partial FAI?

B9. Response:
9102 is not retroactive. A 9102 partial may be completed using the original completed baseline. See question A9.

B10. Question:
Is an FAI required for unique single run production orders.

B10. Response:
Section 1.3 states, unless contractually required, the standard does not apply to "Unique single run production orders, not intended for ongoing production". Single Run production orders are a one-time run of a product that is not intended for ongoing production, but may be installed on a production unit.

C. Standard Catalogue and Commercial-Off-The-Shelf (COTS) Items

C1. Question:
Where is Standard Catalogue and Commercial-Off-The-Shelf (COTS) Items entered on the First Article Inspection Report (FAIR)?

C1. Response:
Standard Catalogue and Commercial-Off-The-Shelf (COTS) Items, when used as purchased, are entered on form 1. If Standard Catalogue or Commercial-Off-The-Shelf (COTS) Items (e.g., AN, MS fasteners) are modified, then list that Standard Catalogue or Commercial-Off-The-Shelf (COTS) Items on form 2, field 6.

C2. Question:
Are COTS and Standard Catalogue Item C of C required with a FAIR, for items recorded on Form 1?

C2. Answer:
The standard requires that non-modified Standard Catalogue Items and Commercial-Off-The-Self items are listed on form 1 of the FAI. Field 18 is for the FAIR number and does not require the CofC number to be recorded in this field. Since no CofC number is required to be documented on form 1 of the FAI, the CofC would not be required for supporting documentation.

C3. Question:
How is Standard Catalogue Items defined?

C3. Response:
Any item purchased from a catalogue available to the public is considered a Standard Catalogue Items. 9102 defines Standard Catalogue Items as: A part or material that conforms to an established industry or national authority published specification, having all characteristics identified by text description or industry/national/military standard drawing.

C4. Question:
What is the definition of a Modified Commercial-Off-the-Shelf Item? Can it be a COTS item that is changed in manufacturing or is it a COTS item that is purchased and changed?

C4. Answer:
A modified COTS item would be a COTS item that has a change made to it from its originally purchased configuration. An item that has the configuration changed during the manufacturing process would be a "similar part".

C5. Question:
Are company designed standards, like Boeing's BAC standards, considered Standard Catalogue Items?

C5. Response:
No. Company designed standards are not available to the public and do not meet the definition. Parts manufactured to company designed standards are entered on form 1. (See answer to Question C1).

D. Similar Parts

D1. Question:
Paragraph 4.6 states in part - FAI requirements may be satisfied by previously approved FAI performed on identical characteristics of similar parts produced by identical means. How similar do the parts have to be?

D1. Response:
If a series of parts are made using the same processes and the parts are identical except for a few characteristics, a complete FAI can be done on one part and for the others, account for the unique characteristics. On form 3 for the "other parts", record the unique characteristics and refer back to the full FAI for the identical characteristics. The key is traceability and that all characteristics are accounted for.

E. Purchase Order Requirements

E1. Question:
Does 9102 allow inspection to Purchase Order requirements?

E1. Response:
Yes. The 9102 definition of drawing requirements indicates that the requirement may be invoked by purchasing document. 9102 definitions: "DRAWING REQUIREMENTS: "Requirements of the drawing and associated parts lists, specification, or purchasing document to which the product is to
be produced from, including any notes, specifications, and lower-level drawings invoked.." Use Form 1, field 8 to list the Additional Changes. The Additional Changes in the Purchase Order including added and deleted characteristics are to be reported in Form 3. (e.g. omit fasteners, excess material)

F. General Questions

F1. Question:
Are 9100 requirements duplicated in 9102?

F1. Response:
9102 requirements are not intended to duplicate 9100 requirements or test 9100 compliance. Each is a standalone standard.

F2. Question:
What is the relationship between 9102 paragraph 4.6 and 9100 paragraph 7.5.1.1?

F2. Response:
9102 is one means of meeting 7.5.1.1 but is not mandated by 9100.

F3. Question:
What does "First Production Run" mean?

F3. Response:
The first production run is 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. The first production delivery parts require an FAI. Development and prototype parts that are not intended for production use are not considered as part of the first production run.

F4. Question:
How is a partial FAI documented?

F4. Response:
When performing a partial FAI, use form 1 and only the additional forms required to document the change. Also, reference the original FAI on form 1, field 14. The original forms must never be altered. You may use attachments to any form if more space is needed.

F5. Question:
Can an FAI be completed when a non-conformance exists?

F5. Response:
The non-conformance must be corrected and the correction verified and documented on new forms at the next production run before considering the FAI "completed".
The FAI with design characteristic nonconformance(s) is Not Complete. An FAI with noted nonconforming design characteristics should have field 19 signed and noted as “Not Complete”

- When processing a FAIR with documented non-conformances:
- Record the nonconforming design characteristic(s) on form 3.
- Record the nonconformance document reference number on form 3 field 11.

Check the box “FAI Not Complete” on form 1 field 19. Note: this standard does not control disposition of the nonconformance.
The Organization implements corrective actions and performs a partial FAI for all affected characteristics on the next production run after implementation of the corrective action. If the partial FAI does not clear all non-conformances, the FAI is still Not Complete and the requirement to complete the FAI is still in effect. Note: a full FAI may be done in lieu of a partial FAI.

F6. Question:
How are unique characteristic numbers established?

F6. Response:
Standards provide requirements and cannot provide methods. You may use any technique that provides traceability from the engineering to the FAI report.

F7. Question:
Is it a requirement to have a ballooned drawing in the FAI report?

F7. Answer:
The ballooned drawing is often used to show verification that “every design characteristic requirement is accounted for, uniquely identified, and has inspection results traceable to each unique identifier.” However, there is no requirement in 9102 for a ballooned drawing to be used, so there no requirement for it to be part of the supporting documentation. Part of the planning process section 4.2.c.3 is the “Determination of objective evidence to be included in the FAIR for each design characteristic.” The company’s FAI procedure should detail how they are accounting for each design characteristic.

F8. Question:
Is N/A required to be entered on fields that do not contain information?

F8. Answer:
This needs to be defined in your QMS procedures.

F9. Question:
In the definition of First Article Inspection, what is the meaning of independent as used in 9102?

F9. Answer:
The person that verifies the characteristic for the First Article cannot be the same person that generated the characteristic. Self-inspection is not permitted (ie. operator self-verification). Also, the equipment used to verify the characteristic needs to be different from the equipment used to produce the characteristic.

F10. Question:
What is expected for evidence of characteristics that are not able to be verified in the final product?

F10. Answer:
Characteristics not measurable in the final product shall be verified during the manufacturing process, as long as they are not affected by subsequent operations, or by destructive means. Characteristics verified at the detail level may be referenced in the assembly-level FAIR. Your FAI process should address objective evidence to be included in the FAIR for each design characteristic.

F11. Question:
Does "Reference Characteristic" (as defined in 9102) include both, "Basic" dimensions and "Reference" dimensions (as defined in ASME Y14.5-2009)?

F11. Answer:
The 9102 definition of Reference Characteristic is; "The characteristics that are used for information only" or to show relationship. These are dimensions without tolerances and refer to other dimensions on the drawing." Both basic and reference dimensions fall under the definition of reference characteristics.

To access additional First Article Inspection FAI guidance go to www.iaqg.org/scmh accept the terms and conditions for the free guidance and proceed to section 3.2.