

AS9102 Frequently Asked Questions

General

Q: Who developed this standard?

A:

This International Standard for First Article Inspection (FAI) is developed by International Aerospace Quality Group (IAQG). The IAQG chartered a multi-member writing team with representatives from several member companies to write this standard. The standard outlines the documentation and inspection requirements when performing First Article Inspection of aerospace components. It is co-published as

- AS9102 by SAE in Americas
- EN 9102 by AECMA in Europe
- SJAC 9102 by SJAC in Asia

Q: Why are you writing a new standard? We already know how to do FAI!

A:

The IAQG recognizes that the aerospace companies have somewhat common requirements for First Article Inspection (FAI), however, the documentation requirements differ. This non-uniformity of the documentation has created unnecessary errors, confusion and rework. The development and adoption of common standard with unified requirements will

- eliminate common errors and omissions,
- simplify FAI for suppliers,
- focus on product quality rather than documentation

This was the main motivation for writing this Standard.

Q: What was the writing team charter?

A:

The writing team's charter was to develop standardized aerospace FAI requirements and establish a common form of documentation for supplier First Article Inspection.

Q: Is this a "standard" or "guideline"?

➤ **Do I have to meet every requirement of this standard?**

A:

Whether AS9102 is a "standard" or a "guideline" depends upon Customer requirements. AS9102 becomes enforceable only when invoked by Customer.

If a Customer has not established any specific FAI requirements, then per AS9100, AS9102 is to be used as a "guideline" to perform FAI.

However, if a Customer requires FAI to be performed per AS9102, then AS9102 is treated as a "Standard" and not a guideline. In this situation, every requirement of the standard must be met, unless exempted by the Customer.

The IAQG member companies have committed to adopt this Standard as an FAI requirement.

Q: When will this standard be applicable?

A:

Each member company has established its own schedule for adopting this standard as a requirement. Please check with your customer(s) as to when they plan to adopt AS9102.

Q: Do I have to verify every note item on the drawing?

A:

Yes. That's the purpose of FAI.

Measurement System Evaluations/ Effectiveness

Q:

- **Section 5.6 #9 - Gauge correlation, as applicable. Do they refer to calibration records or alternate gauging MSE?**
- **Why is Gauge Correlation, as applicable?... Why don't you "require" it?**

A:

This refers to Measurement System Evaluation (MSE or Gage R&R) study that demonstrates the adequacy of the Measure System.

We didn't explicitly include MSE or Gage R&R in the FAI document as a separate "required", since MSE's are generally done as a separate element and may be included in Inspection Plans. Our intent was that MSE's must be performed "sometime" before using the measurement system, but may not be a part of the part specific FAI. And hence, the term "applicable". It leaves some room for customer discretion, as well as flexibility to be referenced in Inspection Plan.

Q:

Regarding AS9102 Page 18, Paragraph 6.7, item 3A, 5th Bullet States "For First Article Inspections, when these inspection results are near limits of tolerances, additional parts will be inspected to verify hardware conformance".

Clarification requested

- > **Define what "near limit" is by a numerical value.**
- > **How many additional parts will be required to be inspected when the dimension is near the limit?**

A:

This requirement is tied to error margin (or measurement uncertainty) in the Measurement System (generally, determined by Measurement System Evaluation - MSE). The intention is: whenever a measurement is very close to the tolerance limits, it might fall into the error margin, and hence we should take some redundant measurements to convince ourselves that the measurement is indeed acceptable. There are statistical methods to deal with it but such detail techniques may not be necessary to give us the required confidence! A simple redundant inspection might do it. We didn't want to tie ourselves down to a specific numerical limits and want to keep some flexibility. And hence the wordings of the Standard.

Coming back to the specific question... Here is how we interpret. "When FAI inspection results yield measurements on or near spec or drawing limits, further redundant inspection may be required". For example:

Take a dimension with tolerance 0.250 to 0.260

- If the measurement is outside tolerance: reject
- If the measurement is within 10% of the tolerance, (i.e. between .251 and .250 or between .259 and .260), then take two additional but independent measurements of the same feature.
 - If all the measurements are within tolerance, accept.
 - If one of the three measurements are outside the tolerance, then 100% inspection during production.

We picked the number 10% because that is the measurement uncertainty some companies accept in MSE. Others might use a different number or range depending upon criticality of the feature or the measurement system (and associated error margin) used.

Clarifications of Documentation Requirements/ Objective Evidence

Q:

Ref section 5.6 “...Documented evidence of the evaluation...” – what is expected?

A:

Supplier is required to provide objective evidence through quality records that the evaluations of section 5.6 were conducted. The evidence may include (but not limited to) signed record, acceptance stamped (A-Stamped) record, signed reviews by peer, manager or QA, as described by the supplier's quality system, certificates of conformance, corrective action records and closures, MRB records, duly signed published internal reports, etc. Electronic files, so long as they are stored on permanent, secure media, will also be acceptable.

Q:

Ref Section 5.6.6 Personnel certifications - on one of our assemblies, there could be a dozen welders and a like number of NDT technicians. Often when we are doing a first article it's not on a single bleed air duct assembly but a whole ship set of duct assemblies so there would be tremendous redundancy. Further, it implies if a different welder or NDT technician works on the part, a process change has occurred. The integrity of our certification program is audited extensively both internally and externally – it doesn't need to be checked every time we do a first article.

A:

Suppliers are required that they have documented evidence that the operator certifications have been evaluated. Documented evidence may be generically demonstrated via quality system assessment. For example, if you can demonstrate that you have a robust quality system that ensures such evaluations, it may be acceptable and the customer may not demand it every time you do an FAI. Independent, third party certification to AS9100 would cover this as well. The purpose of this requirement here is for the supplier review these certifications and make sure that they accurate, current and available to the customer when requested.

Q:

Ref Section 5.7.16 our routing paper is considered company propriety. It is available to the customer but cannot be included with the first article package.

A:

This requirement is related to demonstrating objective evidence that manufacturing process with which the first article is made is appropriately documented, is traceable and has “revision control”. This requirement states “ record... router number including revision..” It is not expected that you attach routing paper (unless your contract with the customer demands it). A reference to appropriate revision control version of the manufacturing process may be sufficient, as long as you can demonstrate that you are producing parts to that specific process.

Q:

Ref Section 6.4 “Form 2 is required...[when accountability]... is specified on drawing.” I've never seen accountability specified on a drawing (it is a quality requirement), only the raw materials, processes, etc. What is the paragraph trying to say?

A:

Some Customers require accountability of raw material, special process, acceptance testing, etc via drawing or specifications invoked on the drawing. This requirement is to give visibility to such accountability.

Q:

Ref Section 6.4.2.e "Control, Special Procedures..."

- Describe the basic methods and frequencies used to control the material or process. May refer to characteristic number.
- List process specifications.
- Include methods/frequencies used by both the material or process source and by the part Supplier.
- Reference procedures that require Customer approval (e.g. EB welding, ultrasonic, X-Ray, eddy current), with customer approval date. "

The descriptions of process controls are specified in procedures and cannot be practically included on the first article. If the procedure is listed, then the requirement is a redundant paper exercise and not value added.

A:

You may reference the procedure, internal specification, internal report, etc. where such process controls are defined.

Q:

Same as above. Ref Section 6.4.3.b & c "List only tests called out by the Customer drawing (e.g. leak test, pressure test). For Supplier-designed parts, list only acceptance tests, not design assurance tests or qualification tests. On Form 3, reference the data produced by functional tests. ...

**3b) Type of Equipment, Equipment Accuracy and Control, calibration
3c) Frequency and acceptance criteria"**

A:

You may reference the data-report number and attach the data-report to FAI documentation.

Q:

Ref Section 3. There is too much detail instruction in this paragraph – compliance is going to be tough to achieve.

A:

Section 3 is Definitions Section and is to be used for clarification purpose.

Q:

Section 5.6 #11- Part Marking replication- What is acceptable evidence?

A:

Photographs, etching, coupons, actual parts, etc.

Q:

Where must we fill-out on the form, results with production means and result with FAI means?

A:

Form 3, boxes 3 and 4.

Forms

Q:

- ***Why must I use AS9102 Forms?***
- ***Can I use my existing forms with appropriate changes?***

A:

The writing team recognizes that the completeness and accuracy of the FAI report contents is very important, and to assure that, we need clear visibility and uniformity. To ensure uniformity and clear visibility to documentation requirements (e.g. characteristic accountability), AS9102 standardizes the forms. Here is the interpretation of the Section 5.4 regarding Forms:

- If one uses other electronic form, then that form must have one-to-one correspondence for each box discussed in AS9102 forms,
- If paper forms are used, then they must be AS9102 forms,
- Additions to the forms can be made if there are extra company or customer requirements so long as the AS9102 form content remains.

Q:

- ***Can I use electronic forms?***
- ***I plan to modify my existing electronic forms with appropriate modifications to ensure each item of AS9102 forms is clearly accounted for and is visible. Is it acceptable?***

A:

Yes, you may use electronic forms. As long as each box in the AS9102 forms is clearly accounted for and is visible in one place with appropriate Box Number, your use of electronic forms is acceptable. Your Customer may require you to demonstrate that such accountability meets the intent of AS9102 regarding clarity, visibility and uniformity.

Q:

- ***Where can I get Electronic forms?***
- ***Are forms available on Internet?***
- ***AS9102 mentions that forms will be available on Internet, how do I access them?***

A:

Go to <http://www.sae.org/aaqg/publications/as9102a-faq.htm>