

STANDARD ISSUES

Standards-related developments and activities



AS9102

Flight Worthy

Changes to AS9102 Aerospace First
Article Inspection Requirements
by Darrell Ferris

A

erospace Standard (AS) 9102, which establishes the requirements for performing and documenting a first article inspection (FAI), has been undergoing revision (revision C) by the International Aerospace Quality Group (IAQG) since mid-2019 to improve alignment with the AS9100 production process verification section.

This revised standard enhances planning, evaluation and re-accomplishment activities while improving FAI Report (FAIR) documentation forms. These improvements will benefit aviation, space and defense industry organizations and other industry sectors when adopted.

Benefits of improved requirements adoption and compliance

The benefits of the FAI standard update include reductions in escapes, risk and total cost, as well as helping ensure product safety. This improves quality, delivery and customer satisfaction in the form of reduced costs, production delays and late-stage product nonconformances. Conducting FAI to AS9102 assists with:

- Early identification of process issues that produce nonconformances.
- Documented objective evidence in a standardized report, allowing for risk mitigation.
- Validation of corrective actions with a closed-loop FAI process, which is repeated until product nonconformances detected by FAI are eliminated.

FAI revision C will continue to provide confidence in the realization of conforming product by demonstrating that manufacturers and processors understand the associated requirements. FAI can provide objective evidence that a process is capable and mitigates risk with production startup, and provides assurance of initial product or process conformity at the start of production and after changes are implemented.

Revision C has adopted clarification improvements from the AS9102B frequently asked questions and commonly proposed beneficial improvements requested by IAQG sector organizations. Early adoption of the new requirements document by organizations, customers and suppliers will make them less likely to struggle with product escapes related to misinterpretations and ineffective planning.

The release of the revision will be accompanied by guidance material available in the *IAQG Supply Chain Management Handbook* (SCMH),¹ which provides best-practice guidance and examples for FAI completion to help avoid interpretation pitfalls. The SCMH guidance material also may be considered as an additional training resource for organizations and individuals interpreting the standard, and a way to reduce variation in FAI processes.

Notable revisions by section

■ Scope.

The “General” subsection now defines general terms: “shall” is a requirement; “should” is a recommendation; “may” is permission; “can” is a possibility or capability; and “note” helps clarify associated requirements.

The “Application” subsection introduces additional provisions to a certificate of conformance (CoC). The CoC must include a complete list of associated requirements and results rather than simply attesting to conformity, which previously was common practice. This ensures requirements accountability for variations in products (omitted areas or complex geometry, for example) running through common processes.

Furthermore, the “Application” section of the revision has removed the FAI exception for unique single-run production orders (out-of-production spares, for example) not intended for ongoing production due to wide misinterpretation.

■ Terms and definitions.

Newly added definitions include assembly, ballooned design characteristic, ballooned document, detail part and modified commercial-off-the-shelf (COTS)/standard catalog items. These terms have been defined for consistency.

Revised definitions include:

- COTS items—Four requirements must be met to be considered a COTS item:

1. Defined by industry, manufacturer, military or recognized specifications or standards.
2. Without design modification, specifically for a customer.
3. Customarily used by the public or industries.
4. Offered for sale to the public through catalogs, price lists, brochures, stores or websites.

If these are not met, it is not considered COTS and FAI is applicable.

- FAI—note added relative to independent inspection.

■ Requirements.

Subsection numbering was aligned with typical sequence of events.

- “FAI Planning” subsection underwent an extensive rewrite. Each organization is required to have a documented process to plan for FAI that includes identifying the responsible functions and addressing activities to be accomplished before the FAI. Embedded or deliverable software revision configurations must be accounted for during the FAI as part of the FAI plan. This will reduce configuration escapes. Planning for objective evidence in the report is addressed. A note clarifies supporting documentation regarding design characteristics or configuration requirements such as bubbled and ballooned

documents, certifications, inspections and test reports as objective evidence.

- “Part Requirements” removed redundant language covered in subsection “Partial or Re-accomplishment of First Article Inspection.”
- In “Evaluation Activities,” verification of digital product definition design characteristics are ballooned and results recorded, has been added.
- In “Nonconformance Handling,” the terms “FAI complete” and “FAI not complete” have been removed from Form 1, field 19 of the FAIR due to ambiguity. The new requirement uses, “Does FAIR contain documented nonconformance(s)?” with yes/no checkboxes. Nonconformances still are listed on Form 3 of FAIR. Corrective action tracking and FAI reperformance continue via full or partial FAI until there are no nonconformances for the detail or assembly.
- In “Partial or Re-accomplishment of FAI,” a multidisciplinary team must review and determine whether changes invalidate the FAI. This documented process directly identifies affected requirements that must be reassessed and recorded in the subsequent FAI. Clarification was added that downstream nonconformances do not invalidate design characteristics that were verified by FAI prior to parts being scrapped. Item 4.6.e. states that a documented process is required to evaluate changes to realization processes and engineering design requirements.
- **Documentation.**
 - Forms—Alternate forms still may be used as long as the same fields and reference numbers are used coinciding with this revision, and conditional fields may be left blank when not applicable.
 - Recording results—newly added clarification. Variables data shall be expressed to equivalent accuracy of the tolerance of measurement (that is, numerical places).
- **Appendix B forms and instructions**
 - Forms 1, 2 and 3—fields and instructions were changed, such as yes/no checkboxes relating to nonconformances

as discussed earlier as opposed to FAI completion status. The first signature field was replaced by “FAI Verified By,” and now only one set of signatures is required for the entire FAIR, removing separate signatures on each form.

Ensuring organizational readiness

The following actions should be taken to ensure readiness and compliance:

1. Review current command media and procedures, identify changes or additions, and plan implementation needs for internal and external stakeholders. Often, this is called a procedural gap analysis evaluation for areas including:
 - FAIR preparation methods such as software or forms
 - Contractual flow-down documents. Perform updates and notify employees and the supply base.
2. Communicate to stakeholders (internal and external) the new needs, such as detailed CoC that must list requirements and results.
3. Prepare for training and awareness of affected employees including use of the new SCM FAI guidance materials. **QP**

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REFERENCE

1. International Aerospace Quality Group, Supply Chain Management Handbook website, <https://scmh.iaqg.org>.



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