First Article Inspection

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1.0 Purpose and Scope

1.1 **Purpose:** The primary purpose of First Article Inspection (FAI) is to verify and validate product realization processes are capable of producing characteristics that meet engineering and design requirements. A well-planned and executed FAI by a multi-disciplinary team (e.g., members from responsible functions) provides objective evidence the manufacturer's processes can produce compliant product; having effectively understood and incorporated the associated requirements.

1.1.1 First Article Inspection Report (FAIR) is to provide objective evidence that all engineering design and specification requirements are properly understood, accounted for, verified, and documented.

1.1.2 The purpose of this procedure is to provide a consistent documented requirement for First Article Inspection, to provide guideline for conducting and presenting a First Article Inspection (FAI) and / or First Article Test Report (FATR) and responsibilities.

1.1.3 The FAI will:

1.1.3.1 Provide confidence, through objective evidence, the product realization processes are capable of producing conforming product.

1.1.3.2 Demonstrate the manufacturers and processors of the product understand the associated requirements.

1.1.3.3 Provide assurance of product conformance at the start of production and after changes, as outlined in this standard.

1.1.4 A FAI is intended to:

1.1.4.1 Mitigate risks associated with production startup and process changes.

1.1.4.2 Reduce future escapes.

1.1.4.3 Help ensure safety of our customers and team members.

1.1.4.4 Improve quality, delivery, and customer satisfaction.

1.1.4.5 Reduce costs and production delays associated with product non-conformances.

1.1.4.6 Identify product realization processes that are not capable of producing conforming product and initiate and/or validate corrective actions.

1.2 Scope

1.2.1 Applies to all HDT Expeditionary System Inc. (HDT) and sub-tier supplier product meeting the FAI requirements as stated herein.

1.2.2 HDT has adopted Aerospace Standard AS9102 Aerospace Series - First Article

Inspection Requirements as its foundation for the First Article Inspection process because it is the most widely accepted standard. When practicable and at the discretion of Engineering and Quality Managers, HDT will follow the AS9102's guidance.

2.0 ISO (QMS) References

The following referenced documents support the application/use of this procedure. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies. When a conflict in requirements between this procedure and the referenced documents below exist, the requirements of those document shall take precedence.

Reference Number	Description
ISO 9001:2015	Monitoring and Measurement of Product
AS9102	Aerospace Standard First Article Inspection/Procedure (See attachment 1)
H003817	Engineering Playbook (Prototypes)
GQAF 0034	HDT FAI Format
GQAI 7.3-1	Engineering Change Process
GQAF 0001	Engineering Change Forms
GQAF 0003	Request for Variance - External
GQAF 0005	Request for Variance - Internal
HDTP000006	Records Management and Retention Policy

3.0 Terms, Definitions, and Acronyms

Definitions for general terms can be found in ISO 9000 and the IAQG International Dictionary (located on the IAQG website). For this procedure, the following definitions apply.

2D - Two-Dimensional
3D - Three-Dimensional
ACCEPTANCE TEST PLAN (ATP) - Describes the acceptance testing process, such as the features to be tested, pass/fail criteria, approach to testing, roles and responsibilities, resource requirements and schedules.
ASSEMBLY – See AS9102 definition 3.1.
ATTRIBUTE DATA - See AS9102 definition 3.2.
BALLOONED DESIGN CHARACTERISTIC - See AS9102 definition 3.3.
BALLOONED DOCUMENT - See AS9102 definition 3.4.
BASELINE PART NUMBER - See AS9102 definition 3.5.
BOM – Bill of Material
CERTIFICATE OF ANALYSIS (CoA): A laboratory or otherwise test report providing actual results of testing or examination validating that specified requirements have been met.

- See GQAI 7.4-19 Supplier Quality & Procurement Requirements, 18.0 Certifications

CERTIFICATE OF CONFORMANCE / CONFORMITY (CoC): A signed document from the provider stating that the parts were manufactured in compliance with all drawing and specification requirements and that records of such conformance are available upon request.

- See GQAI 7.4-19 Supplier Quality & Procurement Requirements, 18.0 Certifications

CMM - Coordinate Measurement Machine

CMS - Coordinate Measurement System

COMMERCIAL-OFF-THE-SHELF (COTS} ITEM - See AS9102 definition 3.6.

- Cross-reference: MODIFIED COMMERCIAL-OFF-THE-SHELF (COTS) and STANDARD CATALOGUE ITEM

DELIVERABLE SOFTWARE - See AS9102 definition 3.7.

DESIGN CHARACTERISTIC - See AS9102 definition 3.8.

DESIGNED TOOLING - See AS9102 definition 3.9.

DETAIL PART - See AS9102 definition 3.10.

DELTA FIRST ARTICLE INSPECTION – See Partial First Article Inspection (Delta FAI).

DIGITAL PRODUCT DEFINITION (DPD) - See AS9102 definition 3.11.

DEVIATION - A requests for a departure from the specification before the part is built. See VARIANCE.

ENGINEERING CHANGE (EC) - this relates to the HDT EC process (GQAI 7.3-1) to have traceability and approvals for any changes.

- See H003817 Engineering Playbook and GQAI 7.3-1 Engineering Change Process

ENGINEERING CHANGE PROPOSALS (ECP) – Requests to HDT customer to execute a proposed change.

- See H003817 Engineering Playbook and GQAI 7.3-1 Engineering Change Process

ePDM – Enterprise Product Data Management is a system for recording and managing design and engineering files, like computer-aided design (CAD) files, design drawings, engineering models, technical specs, manufacturing requirements, and bills of materials.

FIRST ARTICLE INSPECTION (FAI) - See AS9102 definition 3.12.

FIRST ARTICLE INSPECTION REPORT (FAIR) - See AS9102 definition 3.13.

- Is revised to include “Comprised of the forms identified in [AS9102] Appendix B” or equivalent.

FIRST PRODUCTION RUN - See AS9102 definition 3.14.

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

FIXED PROCESS - Once a product is validated through FAI, no changes to significant operations or revisions to product unless it goes through the formal EC process defined.

MILITARY STANDARD (MS) - Part number starts with MS and is manufactured to a Military Standard specific to the part.

MODIFIED COMMERCIAL-OFF-THE-SHELF (COTS)/STANDARD CATALOGUE ITEM) - See AS9102 definition 3.15.

- Cross-reference: COMMERCIAL-OFF-THE-SHELF (COTS} ITEM and STANDARD CATALOGUE ITEM

MULTIPLE CHARACTERISTICS - See AS9102 definition 3.16.

NATIONAL AEROSPACE STANDARD (NAS) - Part number starts with NAS and is manufactured to a National Aerospace Standard specific to the part.

NON-DESTRUCTIVE TESTING (NDT) - Testing of product such as liquid dye penetrant, magnetic particle inspection, x-ray, etc. which does not affect the functionality or usability of the part (s).

PARTIAL FIRST ARTICLE INSPECTION (Delta FAI) – See AS9102 definition 4.6.

PRODUCT - See AS9102 definition 3.17.

PROTOTYPE – Prototypes are early product concepts used to evaluate form, fit or function of a product.

- Development and prototype parts that are not considered as part of the first production run.
- See H003817 Engineering Playbook and GQAI 7.3-1 Engineering Change Process

PROTOTYPE FIRST ARTICLE INSPECTION (PFAI)

- See H003817 Engineering Playbook and GQAI 7.3-1 Engineering Change Process

QUALIFIED TOOLING - See AS9102 definition 3.18.
QUALITY ASSURANCE PROCEDURE (QAP) - documented information determined by the organization as being necessary for the effectiveness of the process.
REFERENCE CHARACTERISTIC - See AS9102 definition 3.19.
REQUEST FOR VARIANCE (RFV) - Approval from the customer, where applicable to deviate from requirements. Engineering approval is required for all RFV requests where HDT has MRB authority

- See H003817 Engineering Playbook and GQAI 7.3-1 Engineering Change Process

SIGNIFICANT OPERATION - As deemed by HDT Manufacturing Engineering.
Society of Automotive Engineers (SAE) - Part number starts with SAE and is manufactured to a Society of Automotive Engineers standard specific to the part.
SPECIAL PROCESS - See AS9102 definition 3.20.
STANDARD CATALOGUE ITEM - See AS9102 definition 3.21.

- Cross-reference: COMMERCIAL-OFF-THE-SHELF (COTS} ITEM and MODIFIED COMMERCIAL-OFF-THE-SHELF (COTS)/STANDARD CATALOGUE ITEM

UNLESS OTHERWISE STATED (UOS)
VARIANCE – A an authorization to depart from the as-designed configuration for a specific number of units and or for a specified period.

- See REQUEST FOR VARIANCE (RFV)
- See H003817 Engineering Playbook and GQAI 7.3-1 Engineering Change Process

VARIABLE DATA - See AS9102 definition 3.22.
WAIVER – A request for acceptance of nonconformance material prior to the parts being received or used in production. See VARIANCE.

Note: Additional acronyms can be referenced in AS9102 APPENDIX A - ACRONYM LOG.

4.0 Procedures

4.1 First Article Inspection Planning – HDT will comply with the applicable portions of AS9102 4.1 First Article Inspection Planning with completed FAI planning activities being the release of the FAI Production Order and associated inspection documents.

4.1.1 GQAI 7.3-1 Engineering Change Process. Guidance:
"A FAI is required before a new part is introduced into production and after a modification affecting fit, form, or function to an existing product; it is also required before accepting a first build of an HDT engineered drawing from any outside supplier, process changes, as required by customer or contract. FAI may be required after changes or modifications to parts, drawings, etc. have been made."

4.1.2 GQAF 0001 Engineering Change Forms, Detail tab, *"Provide details for each part affected by ECR on First Article Inspection requirements as determined by Quality Assurance or Engineering."*

4.1.3 When there is a change to the physical or material makeup of the part, the requirement to perform a first article is identified during the Engineering Change Process and documented in ePDM. A flag must be systematically performed in SAP by Quality, Engineering or Supply Chain.

4.1.4 Control of changes after FAI validation. Once a Production FAI is performed, no changes shall be made unless approved by Quality and Engineering. The changes will

be approved during the Engineering Configuration Control Board (CCB) Process at which time the FAI requirements will be determined.

4.1.5 Prototype FAI. Prototypes are early product concepts used to evaluate form, fit or function of a product. Prototypes can be sold and delivered to customers as early product samples to gain customer feedback and further evaluate customer requirements. The customer must be aware that these deliverables are prototypes and they are not produced using HDT's production processes.

4.1.5.1 Prototype FAI will be referenced as PFAI

4.1.5.2 Engineering is responsible to prepare and document a FAI on Prototypes (PFAI), unless otherwise agreed with Quality.

4.1.5.3 Primary approver of Prototype FAI is Engineering, Secondary approval Quality.

4.1.5.4 It is recommended that Prototypes are conspicuously marked or identified as "Prototype" and or painted a different color as deemed necessary by Engineering.

4.1.5.5 Prototype FAI's (PFAI) must be retrievable upon Formal FAI submission.

4.1.5.6 Configuration Control of Prototype designs should be captured in ePDM using the process defined in the Engineering Playbook (PROTOTYPE watermark on drawings and numerical (01,02, etc.) revision strategy, See Section 4 of the Engineering Playbook).

4.2 Part Requirements - HDT will comply with the applicable portions of AS9102 4.2 Part Requirements.

4.2.1 Sampling Size. Based on internal or contractual requirements, HDT Quality Manager, or designee, will designate the required sample size produced on the same equipment and using the same manufacturing process as defined for production.

4.3 Digital Product Definition Requirements – HDT will comply with the applicable portions of AS9102 4.3 Digital Product Definition Requirements. When applicable for DPD format requirements required for product realization, HDT Engineering will extract and verify the characteristics and these will be included in the FAIR.

4.4 Evaluation Activities - HDT will comply with the applicable portions of AS9102 4.4 Evaluation Activities.

4.5 Nonconformance Handling - HDT will comply with the applicable portions of AS9102 4.5 Nonconformance Handling.

4.5.1 GQAI 7.3-1 Engineering Change Process allows for the use of the variance process to correct the product realization process until it delivers the intended output (conforming design characteristics):

"If the RFV affects form, fit or function of the item/product or if the contract requires customer approval/notification, then the RFV is considered external and all customer approvals are obtained prior to acceptance. Otherwise, the RFV is considered internal only and internal functional approvals are the only required approvals."

4.6 Partial or Re-Accomplishment of First Article Inspection - HDT will comply with the applicable portions of AS9102 4.6 Partial or Re-Accomplishment of First Article Inspection.

4.6.1 During the GQAI 7.3-1 Engineering Change Process, HDT evaluates any changes to product realization processes or engineering/design requirements that invalidate or are not represented in the previous FAI. HDT with perform a full or partial FAI, as determined by the evaluation.

4.6.1.1 Based on internal or contractual requirements, the HDT Quality Manager, or

designee, will define FAI sample size requirements and/or whether a partial or Delta FAI is acceptable.

4.6.2 HDT will perform the evaluation when any of the following occurs:

4.6.2.1 A change in engineering definition affecting design characteristics.

4.6.2.2 A change in manufacturing source(s) (e.g., supplier and/or sub-supplier), process(es), inspection method(s), tooling, materials/alternate materials, or location of manufacture.

4.6.2.2.1 Change in Manufacturing process. All significant changes to the manufacturing process must be documented through the EC process and approved. Where applicable, significant changes will be submitted to the customer for approval.

4.6.2.2.2 Change in Supplier. Supply Chain must notify Quality and Engineering prior to any change to a Supplier through the EC process. Quality or Supply Chain must ensure that the Material Master for the component is flagged as Quality relevant for receiving inspection and validation of a new supplier. First Article requirement must be flowed down to the supplier and accompany the first shipment using the AS9102 form or equivalent (QAF0034).

4.6.2.2.3 Change in Manufacturing location. Manufacturing Engineering and Operations must approve the manufacturing change location. This change must be formally documented through the EC Process and follow the internal change protocol to ensure all risks have been identified and mitigated. Where applicable, this must be communicated to the respective Sales POC and customer formal customer approval obtained.

4.6.2.3 A change in the numerical control program or translation to another media.

4.6.2.4 A natural or man-made event, which can adversely affect the manufacturing process.

4.6.2.5 An implementation of corrective action required to complete a previous FAI, as defined in Nonconformance Handling.

4.6.2.6 A lapse in production or purchase for two years for any characteristics that may be impacted. This lapse is from the completion of the last production operation to the actual restart of production.

4.6.2.7 FAI is a contractual requirement,

4.7 Documentation - HDT will comply with the applicable portions of AS9102 4.7 Documentation.

4.7.1 Forms. "Comprised of the forms identified in [AS9102] Appendix B" or equivalent.

4.7.1.1 In-process FAI inspection can be documented in a format designated as acceptable by the Quality Manager, however, final FAI packages for top level part numbers must be documented per the AS9102 procedure. FAI must be documented on AS9102 forms or equivalent (QAF 0028) for submission to the customer and/or file retention.

4.8 Retained Documented Information - HDT will comply with the applicable portions of AS9102 4.8 Retained Documented Information.

4.8.1 FAI (and PFAI) documented information is a quality record. Documented information with substantiating evidence of validation retained as evidence of conformity shall be protected from unintended alterations.

4.8.2 FAI documented information will be retained according to applicable customer, regulatory, or HDTP000006 Records Management and Retention Policy requirements; whichever is longer.

4.9 HDT will comply with the applicable portions of AS9102 Appendix A and B.

5.0 **First Article Inspection Package Requirements.** The content of a final FAI package may vary. However, content must include the following, unless otherwise stipulated by the HDT Quality or Engineering Manager.

5.1 First Article Inspection Package Requirements - Internal Package

5.1.1 A ballooned / numbered drawing identifying all characteristics on the drawing (this includes all dimensional callouts as well as all other notes and requirements including those identified on associated drawings and / or QAPs).

Note: The drawing utilized must be what is contractually sold or purchased by HDT. No external supplier drawings shall be used.

5.1.2 A ballooned purchase order or contractual documentation outlining requirements.

5.1.3 A formal report verifying each requirement ballooned on the drawings with variable data, when applicable. This report shall contain the part and revision number, the part description, and be numbered per the ballooned drawing(s) and contain the specified requirement, all specified tolerances, and actual variable or attribute data as applicable.

5.1.4 Test reports, Certificate of Conformance, Certificate of Analysis, or any other objective evidence to demonstrate that characteristics such as performance specifications, materials, finishes, NDT, etc. have been tested and confirmed.

5.1.5 A copy of the router to demonstrate sequence of operations or method of manufacture at the time the FAI is being performed.

5.1.6 Any Engineering Change Proposals (ECP) or Approved Request for Variance (RFV) in lieu of meeting contractual requirements.

5.1.7 Cover page with Customer, Part Number, Revision, Final Approval signatures as deemed required by Quality and/or Engineering.

5.1.8 Unless otherwise specified by contract or purchase order, NAS, MS, SAE certified and COTs (commercial off the shelf) items that do not require a formal FAI are required to be accompanied by a C of C indicating they meet all specified requirements.

5.2 First Article Inspection Package Requirements - External Packages (to Customer and from Supplier)

5.2.1 A ballooned / numbered drawing identifying all characteristics on the drawing (this includes all dimensional callouts as well as all other notes and requirements including those identified on associated drawings and / or QAPs).

Note: The drawing utilized must be what is contractually purchased from the customer. No external supplier drawings shall be used.

5.2.2 A ballooned purchase order or contractual documentation outlining requirements.

5.2.3 A formal report verifying each requirement ballooned on the drawings with variable

data, when applicable. This report shall contain the part and revision number, the part description, and be numbered per the ballooned drawing(s) and contain the specified requirement, all specified tolerances, and actual variable or attribute data as applicable.

5.2.4 Test reports, Certificate of Conformance, Certificate of Analysis, or any other objective evidence to demonstrate that characteristics such as performance specifications, materials, finishes, NDT, etc. have been tested and confirmed.

5.2.5 Any Engineering Change Proposals (ECP) or Approved Request for Variance (RFV) in lieu of meeting contractual requirements.

5.2.6 Cover page with Customer, Part Number, Revision, Final Approval signatures as deemed required by Quality and/or Engineering.

5.2.7 Unless otherwise specified by contract or purchase order, NAS, MS, SAE certified and COTs (commercial off the shelf) items that do not require a formal FAI are required to be accompanied by a C of C indicating they meet all specified requirements.

6.0 Roles & Responsibilities

6.1 Quality Manager, or designee, is responsible for:

- Defining the scope of FAIs
- Conducting First Article Inspection
- Final Approval of First Article Inspection
- Submitting completed FAI package to customer or Program Manager for submission
  - Quality will flag the item in SAP for quality inspection in the material master in SAP so that a FAI can be verified at the time of receipt (for purchase product) for any of the reasons mentioned in 5.1.
- Filing FAI Packages for future retrieval, reference.

6.2 Engineering is responsible for:

- Prototype First Article Inspection (PFAI)
- Engineering design
- Specification Requirements
- Test Validation Plans/Acceptance Test Plan (ATP)
- Approving First Article (as determined by Quality Manager)

6.3 Manufacturing Engineering is responsible for:

- Manufacturing Work Instructions
- Process Capability

6.4 Production Planner is responsible for:

- Identify FAI requirements for HDT fabricated or assembled product and communicating the requirements (via the work order) to the operational shop floor and QA inspection.
- The Planner will clearly identify FAI requirements for HDT fabricated or assembled product. The work order will clearly communicate the FAI requirement (including quantity) to the operational shop floor and QA inspection. Work Orders that require FAI should be printed on colored paper designated by site.

6.5 Supply Chain is responsible for:

- Indicating FAI requirements (including quantities and contractual flow down requirements) to the HDT suppliers via the PO.
- Flag all FAI orders for quality inspection in SAP.

- The respective Buyer and/or Quality will clearly indicate FAI requirements (including quantities and contractual flow down requirements) to the HDT suppliers via the PO. The Buyer will also flag the item in SAP for quality inspection in the material master in SAP so that FAI can be verified at time of receipt when changing a supplier.

6.6 Inside Sales is responsible for:

- Orders requiring a First Article Inspection are entered into SAP as a separate line item for costing, planning and flow down of requirement.
- Build two weeks into lead time for FAI. (Reference Sales Training document)

7.0 Records

Records shall be maintained as follows:

Record	Custodian	Media	Minimum Retention Period
Completed FAI report	Quality	Digital	Per record retention procedure UOS by contract.

8.0 Revision History

Date	Revision	Description	Responsible Person
8-9-2019	Original	Requirements for FAI.	Suzanne E. Weber
2/15/24	2	Requirements for FAI mapped to AS9102.	Eric Campbell

9.0 Approvals

	Date	Name	Title	PDM Signature
Written & Approved by	2/18/2020	Suzanne Weber	Corporate Quality Director	*Suzanne Weber*
Revised & Approved by	2/15/2024	Eric Campbell	VP, Quality	*Eric Campbell*

SAE INTERNATIONAL

AEROSPACE STANDARD

AS9102™ REV. C

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Superseding AS9102B

Technically equivalent writings published in all IAQG sectors

(R) Aerospace Series - First Article Inspection Requirements

RATIONALE

This standard was revised to emphasize and enhance the First Article Inspection (FAI) planning, evaluation, and re-accomplishment activities; aligning requirements to the 9100 standard. Additional changes to the standard requirements, definitions, and associated notes were incorporated in response to stakeholder needs.

FOREWORD

To assure customer satisfaction, the aviation, space, and defense industry organizations must produce and continually improve safe, reliable products that meet or exceed customer and regulatory requirements. The globalization of the industry and the resulting diversity of regional/national requirements and expectations have complicated this objective. End-product organizations face the challenge of assuring the quality and integration of products purchased from suppliers throughout the world and at all levels of the supply chain. Industry suppliers face the challenge of delivering products to multiple customers having varying quality requirements and expectations.

The aviation, space, and defense industry established the International Aerospace Quality Group (IAQG) for the purpose of achieving significant improvements in quality, delivery, safety, and reductions in cost throughout the value stream. This organization includes representation from companies in the Americas, Asia/Pacific, and Europe.

This document standardizes FAI process requirements to the greatest extent possible. While primarily developed for the aviation, space, and defense industry, this standard can also be used in other industry sectors where a standardized FAI process is needed.

TO PLACE A DOCUMENT ORDER: **Tel: 877-606-7323 (inside USA and Canada)**
Tel: +1 724-776-4970 (outside USA)
Fax: 724-776-0790
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SAE WEB ADDRESS: **http://www.sae.org**

For more information on this standard, visit
https://www.sae.org/standards/content/AS9102C/

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1. SCOPE

1.1 General

This standard establishes the requirements for performing and documenting FAI. It is emphasized the requirements specified in this standard are complementary (not alternative) to customer and applicable statutory and regulatory requirements.

1.2 Purpose

The primary purpose of FAI is to verify and validate product realization processes are capable of producing characteristics that meet engineering and design requirements. A well-planned and executed FAI by a multi-disciplinary team (e.g., members from responsible functions) provides objective evidence the manufacturer's processes can produce compliant product; having effectively understood and incorporated the associated requirements.

NOTE: A FAI is not a product acceptance document. While interrelated, FAI and product acceptance are separate activities. The focus of FAI is verification of production processes via assessment of product. FAI and supporting documentation does not provide assurance regarding conformance for product acceptance purposes; neither does the lack of a FAI necessarily imply product is nonconforming to engineering and design requirements.

FAI will:

- Provide confidence, through objective evidence, the product realization processes are capable of producing conforming product.
- Demonstrate the manufacturers and processors of the product have an understanding of the associated requirements.
- Provide assurance of product conformance at the start of production and after changes, as outlined in this standard.

A FAI is intended to:

- Mitigate risks associated with production startup and process changes.
- Reduce future escapes.
- Help ensure product safety.
- Improve quality, delivery, and customer satisfaction.
- Reduce costs and production delays associated with product nonconformances.
- Identify product realization processes not capable of producing conforming characteristics, and initiate and/or validate associated corrective actions.

1.3 Application

This standard applies to organizations and their suppliers responsible for product realization processes that produce the design characteristics of the product. The organization shall flow down the requirements of this standard to suppliers who produce design characteristics.

This standard also applies to suppliers performing special process(es). A Certificate of Conformance (CoC) provided by processors attests to satisfying the requirements. External suppliers providing special process(es) can satisfy this standard's requirements by either:

- Documenting the design characteristics and associated results on a First Article Inspection Report (FAIR).
- Documenting the design characteristics and associated results on a detailed CoC.

This standard applies to assemblies, sub-assemblies, and detail parts including castings, forgings, and modifications to standard catalogue or Commercial-Off-the-Shelf (COTS) items. Each of these items shall have a separate FAI.

Unless contractually required, this standard does not apply to:

- Development and prototype parts that are not considered as part of the first production run.
- Procured standard catalogue item, COTS, or deliverable software. When these items are included in an assembly, they shall be documented in the index of part numbers in an assembly FAIR.

1.4 Informative

If there is a conflict between the requirements of this standard, and customer or applicable statutory/regulatory requirements, the latter shall take precedence.

In this standard, the following verbal forms are used:

- "Shall" indicates a requirement.
- "Should" indicates a recommendation.
- "May" indicates a permission.
- "Can" indicates a possibility or a capability.

Information marked as "NOTE" is for guidance in understanding or clarifying the associated requirement.

2. APPLICABLE DOCUMENTS

The following referenced documents support the application/use of this standard. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies. When a conflict in requirements between this standard and the referenced documents below exist, the requirements of this document shall take precedence.

9100 Quality Management Systems - Requirements for Aviation, Space, and Defense Organizations

9103 Aerospace Series - Quality Management Systems - Variation Management of Key Characteristics

As developed under the auspices of the IAQG and published by various standards bodies [e.g., ASD-STAN, SAE International, European Committee for Standardization (CEN), Japanese Standards Association (JSA)/Society of Japanese Aerospace Companies (SJAC), Brazilian Association for Technical Norms (ABNT)].

ASME Y14.41 Digital Product Definition Data Practices

ISO 9000 Quality management systems - Fundamentals and vocabulary

ISO 16792 Digital Product Definition Data Practices

3. TERMS AND DEFINITIONS

Definitions for general terms can be found in ISO 9000 and the IAQG International Dictionary (located on the IAQG website). An acronym log for this standard is presented in Appendix A. For the purpose of this standard, the following definitions apply.

3.1 ASSEMBLY

A product that is produced by joining two or more detail parts, COTS, standard catalogue item, or sub-assemblies into one item.

3.2 ATTRIBUTE DATA

A result from a characteristic or property that is appraised only as to whether it does or does not conform to a given requirement (e.g., go/no-go, accept/reject, pass/fail).

3.3 BALLOONED DESIGN CHARACTERISTIC

Clear and uniquely identified design characteristic indicated on a ballooned document. The unique identifier may be circled or highlighted for easy visual identification.

3.4 BALLOONED DOCUMENT

An aid used in FAI to identify all the design characteristics, including all documents—e.g., drawings, purchase order, Digital Product Definition (DPD)—typically sequentially numbering the design characteristics and putting a circle around or highlighting the numbered design characteristics.

3.5 BASELINE PART NUMBER

This refers to a part number from the previous FAI or approved configuration, including revision level, to which a partial FAI is performed. An example of an approved configuration is a part produced and verified as conforming product prior to the requirements of this standard.

3.6 COMMERCIAL-OFF-THE-SHELF (COTS) ITEM

Commercially available item intended by design to be procured and utilized without modification (e.g., common electronic components). Any item or assembly meeting all of the following requirements:

a. Defined by industry, manufacturer, military, or recognized specifications or standards.

b. Without design modification, specifically for a customer.

c. Customarily used by the public or industries.

d. Offered for sale to the public, through catalogues, price list, brochures, stores, or websites.

3.7 DELIVERABLE SOFTWARE

Embedded or loadable airborne, spaceborne, or ground support software or firmware components which are part of an aircraft type design, weapon system, missile, or spacecraft.

3.8 DESIGN CHARACTERISTIC

Dimensional, visual, functional, mechanical, and material features or properties, which describe and constitute the design of the product. These characteristics can be measured, inspected, tested, or verified to determine conformance to the design requirements as specified on the parts list, purchasing document, drawing, or DPD, to which the product is to be produced.

- Dimensional design characteristics include in-process locating features (e.g., additive manufacturing, target-machined or forged/cast dimensions on forgings and castings, weld/braze joint preparation necessary for acceptance of finished joint).

- Material design characteristics include processing output variable (e.g., plating or coating thickness/runout, material hardness/conductivity). These provide assurance of intended characteristics that could not be otherwise defined.

3.9 DESIGNED TOOLING

Product specific tooling [e.g., check fixtures, Coordinate Measurement Machine (CMM) program] specifically made to validate the design characteristics of a product.

3.10 DETAIL PART

Article/part produced to engineering definition that does not include assembly processes (i.e., processes that join two or more parts together). Detail parts may include processing, finishes, and/or special process(es).

3.11 DIGITAL PRODUCT DEFINITION (DPD)

Digital data file(s) that disclose, directly or by reference, the physical or functional requirements, including data files that disclose the design or acceptance criteria of a product. Examples of DPD include the following:

- Digital data file(s) and fully dimensioned two-dimensional (2D) drawing sheets.

- Three-dimensional (3D) data model, and simplified or reduced content 2D drawing sheets.

- 3D data model with design characteristics displayed as text.

- Any other data files containing design characteristics that define a product in its entirety.

3.12 FIRST ARTICLE INSPECTION (FAI)

A planned, complete, independent, and documented inspection and verification process to ensure that prescribed production processes have produced an item conforming to engineering drawings, DPD, planning, purchase order, engineering specifications, and/or other applicable design documents.

NOTE: The intent of independent as referenced above is to mitigate the effect of measurement error. This includes ensuring the person that verifies the characteristic for the first article not be the same person that generated the characteristic. Self-inspection (i.e., operator self-verification) is not considered independent. The equipment used to verify the characteristic should be different from the equipment used to produce the characteristic.

3.13 FIRST ARTICLE INSPECTION REPORT (FAIR)

Comprised of the forms identified in Appendix B, all ballooned design characteristics, and the supporting documentation determined by FAI planning for a part number (e.g., detail part, sub-assembly, or assembly).

3.14 FIRST PRODUCTION RUN

The initial group of one or more parts that are the result of a planned process designed to be used for production of these same parts.

3.15 MODIFIED COMMERCIAL-OFF-THE-SHELF (COTS)/STANDARD CATALOGUE ITEM

A COTS or Standard Catalogue item that has a change made to it from its original designed configuration.

NOTE: Once modified, these items are categorized as detail parts for the purpose of assembly.

3.16 MULTIPLE CHARACTERISTICS

Identical characteristics that occur at more than one location (e.g., four places), but are identified by a single set of drawing or DPD requirements (e.g., rivet hole size, dovetail slots, corner radii, chemical milling pocket thickness).

3.17 PRODUCT

Any intended output resulting from the product realization process, which in the context of this standard includes finished detail parts, sub-assemblies, assemblies, forgings, and castings.

3.18 QUALIFIED TOOLING

Universal (not part specific) calibrated monitoring and measuring equipment (e.g., go/no go gauges, thread gauges, radius gauges) used to validate product design characteristics using attribute data.

3.19 REFERENCE CHARACTERISTIC

Characteristic (including reference and basic dimensions) that are used for “information only” or to show relationship; these are dimensions without tolerances and refer to other dimensions on the drawing or in the DPD.

3.20 SPECIAL PROCESS

Any process for production and service provision where the resulting output cannot be verified by subsequent monitoring or measurement and, as a consequence, deficiencies become apparent only after the product is in use or the service has been delivered.

3.21 STANDARD CATALOGUE ITEM

A part or material that conforms to an established industry or national authority published specification, having all characteristics identified by written description or an industry/national/military standard drawing.

3.22 VARIABLE DATA

Quantitative measurements taken on a continuous scale (e.g., the diameter of a cylinder, the gap between mating parts).

4. REQUIREMENTS

4.1 First Article Inspection Planning

a. The organization shall have a documented process to plan for FAI. This process shall identify the responsible functions and address the activities to be performed, prior to the first production run.

b. The organization shall verify the revision for embedded or deliverable software as defined by the Bill of Materials (BOM), drawing/DPD, specification, or purchase order requirements.

c. The organization shall consider the following activities, during FAI planning and, if required by contract, coordinate planning with the customer:

   1. Determine design characteristic inspection and sequencing for inspection of characteristics not measurable in the final product and provisions to carry out those activities at the appropriate stage of the manufacturing process.

   2. Evaluate DPD design characteristics required for product realization which are not fully defined on 2D drawings, including tolerances for nominal dimensions.

   3. Determine the required objective evidence to be included in the FAIR for each design characteristic, including supporting documentation.

   NOTE: This includes bubbled or ballooned document(s), and may also include certifications, inspection reports, test reports, manufacturing plans, purchase orders, etc.

   4. Identify the approved special process, laboratory, material, and customer required sources, as applicable, and confirm the manufacturing planning, routing, and purchase document identify the correct specification and relevant sources.

   5. Identify key characteristic and critical item requirements, as applicable (refer to IAQG standards 9100 and 9103 for supporting guidance/direction).

   6. Determine suitable monitoring and measuring equipment of appropriate resolution and accuracy. Ensure part specific gauges and tooling are identified, qualified, and traceable.

   NOTE: Metrology principles (e.g., accuracy ratio, measurement uncertainty) should be taken into consideration when selecting a measurement method.

   7. Coordination of customer FAI review(s) at any stage.

   8. Identify events requiring an updated FAI (see 4.6).

d. The organization shall verify FAI planning activities have been completed.

4.2 Part Requirements

a. The organization shall perform a FAI on new product representative of the first production run. The first production product delivery requires a FAI.

b. The organization shall use one or more representative items from the first production run of a new product to verify that the production processes, production documentation, and tooling have the ability to produce products that meet established requirements.

c. For assemblies, the assembly level FAI shall be performed on those characteristics specified on the assembly drawing or DPD.

d. Detail part characteristics created or modified during assembly may be accounted for at the assembly level FAI, all other detail part characteristics shall be accounted for on the detail part FAI.

4.3 Digital Product Definition Requirements

a. 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 shall be extracted, verified, and included in the FAIR.

b. The organization shall:

1. Establish a process to extract the applicable DPD design characteristics.

2. Extract the DPD design characteristics required for product realization.

3. Ensure the production, inspection, and operations requiring verification have been completed as planned to achieve DPD design characteristics.

NOTE: For additional information on DPD, refer to ASME Y14.41 and/or ISO 16792.

4.4 Evaluation Activities

The organization shall conduct the following activities during product realization in support of FAI to ensure conformance with design characteristics:

a. Review the manufacturing process documentation (e.g., routing sheets, risk analysis, manufacturing or quality plans, manufacturing work instructions) to ensure all operations are complete as planned and call out the correct specification, material types, conditions, and approvals.

b. Review supporting documentation for completeness.

c. Verify the raw material and special process certifications (e.g., CofC, special process completion certification, raw material test report number, modified standard catalogue item compliance report number, traceability number) call out the correct specification, material types, conditions, and approvals.

d. Verify that required customer approved sources are utilized (e.g., directed source, approved suppliers list).

e. Review nonconformance documentation for completeness.

f. Verify that required designed tooling (e.g., part specific gauges) is used.

g. Verify that every design characteristic requirement, including DPD characteristics as required per 4.3.b, is accounted for, uniquely identified, and has inspection results traceable to each unique identifier (e.g., ballooned design characteristic).

h. Verify the design characteristics resulting from the output of the manufacturing process are measured, inspected, tested, or verified to determine conformance, including DPD characteristics as required per 4.3.b.

i. Verify part marking has met defined requirements, such as legibility (i.e., human/machine readable), method, material, content, size, and location.

4.5 Nonconformance Handling

a. When processing a FAIR with documented nonconformances the organization shall:

1. Record the nonconforming design characteristics on Form 3, "Characteristic Accountability, Verification, and Compatibility Evaluation."

2. Record the nonconformance document reference number on Form 3 (see field 11).

3. Check the "Yes" box on Form 1 [see field 19 - "Does FAIR Contain a Documented Nonconformance(s)"].

NOTE: This standard does not address disposition of the nonconformance.

b. The organization shall implement corrective action(s) to correct the product realization process until it delivers the intended output (conforming design characteristics). This process may be subject to multiple iterations and needs to be managed through the organization's quality management system within the context of the corrective action process.

c. Upon implemented corrective action, the organization shall conduct a partial/full FAI, and at a minimum document the corrected nonconforming characteristics and any other characteristics affected by the corrective action.

d. Once all nonconformances have been corrected, check the "No" box on Form 1 [see field 19 - "Does FAIR Contain a Documented Nonconformance(s)"].

NOTE: A full FAI may be performed in lieu of a partial FAI (see 4.6).

4.6 Partial or Re-Accomplishment of First Article Inspection

a. The original FAI requirement shall continue to apply after initial compliance.

b. The FAI shall be repeated when changes occur that invalidate or are not represented in the original results, as determined by a multi-disciplinary team (e.g., members from responsible functions).

c. The FAI requirements shall be satisfied by a FAI that addresses the changes from a baseline part number provided all other characteristics were conforming on the previous FAI and are produced by the original production processes.

NOTE 1: This is referred to as a partial FAI.

NOTE 2: A full FAI may be completed in place of a partial FAI.

d. When performing a partial FAI, the organization shall complete the affected fields in the FAI forms.

e. When performing a partial FAI, the organization shall record the "Baseline Part Number," including the revision level and reason for the partial FAI on Form 1 (see field 14).

NOTE 1: If a nonconformance is detected during FAI, the design characteristics not affected by the nonconformance are still valid, regardless of the product nonconformance disposition (e.g., scrap).

NOTE 2: FAI requirements on a previously approved FAI performed on identical characteristics of similar parts produced by identical means are valid. FAI requirements may be satisfied in this manner. For similar parts made using the same processes (e.g., identical means) except for a few characteristics, a complete FAI can be done on one part and for the similar parts account for only the unique characteristics. On Form 3 for the similar parts, record the unique characteristics. This provides objective evidence and traceability for all applicable design characteristics.

f. The organization shall have a documented process to evaluate any changes to product realization processes or engineering/design requirements (see supporting sub-sections 1-6) that invalidate or are not represented in the previous FAI and then perform a full or partial FAI, as determined by the evaluation. The organization shall perform the evaluation when any of the following occurs:

1. A change in engineering definition affecting design characteristics.
2. A change in manufacturing source(s), process(es), inspection method(s), tooling, materials/alternate materials, or location of manufacture.
3. A change in the numerical control program or translation to another media.
4. A natural or man-made event, which can adversely affect the manufacturing process.
5. An implementation of corrective action required to complete a previous FAI, as defined in 4.5.
6. A lapse in production for two years for any characteristics that may be impacted. This lapse is from the completion of the last production operation to the actual restart of production.

4.7 Documentation

4.7.1 Forms

a. Appendix B contains forms that comply with the documentation requirements of this standard. Forms other than those depicted in Appendix B may be used; however, they shall contain all "Required" and "Conditionally Required" information and have the same field reference numbers.

1. (R) - Required: This is mandatory information.
2. (CR) - Conditionally Required: This field shall be completed, when applicable to the product (e.g., serial number shall be entered when the product has an associated serial number). When not applicable may be left blank.
3. (O) - Optional: This field is provided for convenience; the field may be left blank.

NOTE: Continuation sheets and insertion of additional rows are acceptable.

b. All forms shall be completed either electronically or in permanent ink.

c. All forms shall be completed in English or in a language specified by the customer.

4.7.2 Characteristic Accountability

a. The organization shall verify every design characteristic, during the FAI. Every design characteristic shall have its own unique characteristic number.

b. Reference characteristics may be omitted from the FAI.

c. More than one line may be used, if needed, for any characteristic.

d. 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.

e. Characteristics verified on detail parts may be referenced in the assembly-level FAIR.

4.7.3 Recording Results

a. The organization shall record the requirements and results in the primary units (e.g., metric, imperial systems) as specified on the drawing or DPD, unless otherwise approved by the customer.

b. Results from inspection of design characteristics shall be expressed in quantitative terms (i.e., variable data), to the level of accuracy including tolerance of measurement (i.e., number of decimal places) when a design characteristic is expressed by numerical limits.

    1. Attribute data (e.g., pass/fail) may be used in lieu of variable data when no inspection technique resulting in variable data is feasible. Designed tooling or qualified tooling is consistently used as a check feature and a go/no-go feature has been established for the specific characteristic. When qualified tooling (e.g., radius gauges, comparator, mylar, loft dimensions) are used as a go/no-go gauge, record the gauge value or range (e.g., minimum/maximum value), as applicable.

c. Attribute data shall be used, when the design characteristic does not specify numerical limits (e.g., break all sharp edges).

4.8 Retained Documented Information

a. FAI documentation required by this standard shall be considered a quality record. The organization shall retain the FAIR while the product is being produced and, at a minimum, retain it according to applicable customer or regulatory requirements; whichever is longer.

b. The reviewed and verified quality records shall be retained in accordance with the producer's record retention requirements. The recording of the verification in the FAIR provides evidence of compliance for those records and artifacts.

5. NOTES

5.1 Revision Indicator

A change bar (I) located in the left margin is for the convenience of the user in locating areas where technical revisions, not editorial changes, have been made to the previous issue of this document. An (R) symbol to the left of the document title indicates a complete revision of the document, including technical revisions. Change bars and (R) are not used in original publications, nor in documents that contain editorial changes only.

PREPARED BY THE G-14 AMERICAS AEROSPACE QUALITY STANDARDS COMMITTEE (AAQSC)

APPENDIX A - ACRONYM LOG

2D	Two-Dimensional
3D	Three-Dimensional
ABNT	Brazilian Association for Technical Norms
ASD-STAN	Aero Space and Defense Industries Association of Europe - Standardization
BOM	Bill of Materials
CEN	European Committee for Standardization
CMM	Coordinate Measurement Machine
CMS	Coordinate Measurement System
CoC	Certificate of Conformance (also known as Certificate of Conformity)
COTS	Commercial-off-the-Shelf
DPD	Digital Product Definition
FAI	First Article Inspection
FAIR	First Article Inspection Report
IAQG	International Aerospace Quality Group
JSA	Japanese Standards Association
SJAC	Society of Japanese Aerospace Companies

APPENDIX B - 9102 FORMS AND SUPPORTING FORM INSTRUCTIONS

FORM 1 - PART NUMBER ACCOUNTABILITY

FORM 2 - PRODUCT ACCOUNTABILITY - MATERIALS, SPECIAL PROCESSES, AND FUNCTIONAL TESTING

FORM 3 - CHARACTERISTIC ACCOUNTABILITY, VERIFICATION, AND COMPATIBILITY EVALUATION

This appendix provides the instructions to complete the associated 9102 forms. Each input field is identified as:

- **(R) Required -** This is mandatory information.

  NOTE: These fields are depicted in **bold** font.

- ***(CR) Conditionally Required -*** This field shall be completed when applicable to the product (e.g., serial number shall be entered when there is a serial number). When not applicable, may be left blank.

  NOTE: These fields are depicted in ***bold italic*** font.

- (O) Optional - This field is provided for convenience; the field may be left blank.

  NOTE: These fields are depicted in standard font.

B.1 FORM 1 - PART NUMBER ACCOUNTABILITY

Sheet ___ of ___

1. Part Number:	**2. Part Name:**	***3. Serial Number:***	**4. FAIR Identifier:**
5. Part Revision Level:	***6. Drawing Number:***	***7. Drawing Revision Level:***	***8. Additional Changes:***
9. Manufacturing Process Reference:	**10. Organization Name:**	11. Supplier Code:	12. Purchase Order Number:
13. Detail: _ ☐ - **Assembly:** _ ☐	**14. Full FAI** ☐ **Partial FAI:** ☐ **Baseline Part Number (including revision level):** **Reason for Full / Partial FAI:**		

a) If the part number above is a detail part only, go to field 19.
b) If the part number above is an assembly, go to the "INDEX" section below.

INDEX of part numbers or sub-assembly numbers required to make the assembly noted above.

15. Part Number:	***16. Part Name:***	***17. Part Type:***	***18. FAIR Identifier:***

19. Does FAIR Contain a Documented Nonconformance(s)? ***Yes*** ☐ ***No*** ☐

20. FAIR Verified By:	**21. Date:**
22. FAIR Reviewed/Approved By:	**23. Date:**
24. Customer Approval:	***25. Date:***
26. Comments:	

B.2 FORM 1 - PART NUMBER ACCOUNTABILITY FORM INSTRUCTIONS

This form is used to identify the product that is having the First Article Inspection (FAI) conducted on (e.g., detail part, sub-assembly, assembly); referred to as "FAI part."

NOTE: Data fields 1 thru 4 are repeated on all forms for convenience and traceability. Any subsequent changes to "data fields" 1 thru 4 need to be made to all pages.

1. (R) **Part Number:** Number of the FAI part [e.g., customer part number contained on the purchasing documents; part number from the associated Bill of Materials (BOM); manufacturer part number for internal parts, when customer part number is not available].

***2.* (R)** **Part Name:** Name of the FAI part.

3. (CR) ***Serial Number:*** Serial number of the FAI part; unique identifier assigned to a detail part, sub-assembly, or assembly by the organization or customer.

4. (R) **FAIR Identifier:** Identifier for the First Article Inspection Report (FAIR).

5. (CR) ***Part Revision Level:*** The revision level of the FAI part being inspected. When the part is controlled by a part revision and the part has not been revised, indicate as such (e.g., N/C, No Change).

NOTE 1: The latest drawing or DPD revision (see field 7) does not always affect all parts contained on a drawing or DPD.

NOTE 2: This is the revision level that is identified on the part. Not all organizations use a part revision level for tracking configuration.

6. (CR) ***Drawing Number:*** Drawing and/or DPD number associated with the FAI part; drawing may be from customer, internal system, or design definition.

NOTE: This field identifies all the drawings (including parts list), that contain design characteristics needed for product realization. There may be more than one drawing listed in this field.

7. (CR) ***Drawing Revision Level:*** The revision level of the drawing or DPD associated with the FAI part. If the drawing has not been revised, indicate as such (e.g., N/C, No Change).

NOTE: This field identifies the revision levels of the drawings or DPD sets listed in field 6. When there is more than one entry in field 6, the entries in this field need to correspond to the entries presented in field 6.

8. (CR) ***Additional Changes:*** Provide reference numbers of any changes that are incorporated in the product, but not reflected in referenced drawing/part revision level (e.g., change in design, engineering changes, manufacturing changes, deviation or exclusion from certain drawing or DPD requirements).

9. (R) **Manufacturing Process Reference:** Reference number that provides traceability to the manufacturing record of the FAI part (e.g., router number, manufacturing plan number). Additional information such as lot number, batch number, date code, revision level, or line number may be included, as needed, to provide traceability to the specific manufacturing lot.

10. (R) **Organization Name:** Name of the organization responsible for producing the design characteristics of the product and performing the FAI.

11. (O) Supplier Code: A unique number given by customer to the organization; sometimes referred to as a Vendor Code, Vendor Identification Number, or Supplier Number.

12. (O) Purchase Order Number: Customer purchase order number, if applicable.

13. (R) **Detail/Assembly:** Type of FAI; check, as appropriate.

14. (R) **Full FAI/Partial FAI:** Check the appropriate box (Full FAI or Partial FAI).

For a partial FAI, provide the previous part number, including revision level. For partial FAIs based on similar parts (see 4.6), provide the approved configuration or FAI part number, including revision level.

Baseline Part Number (including revision level): For a partial FAI, provide the previous FAI part number or approved configuration (including revision level).

Reason for Full/Partial FAI: Describe the reason [e.g., new part number; lapse in production; changes in design, process, or manufacturing location (see 4.6)] for the full or partial FAI.

Data Fields 15, 16, 17, and 18: This section is only required if the part number identified in field 1 is an assembly. All BOM parts (e.g., detail parts, sub-assemblies, COTS) that are part of the assembly, identified in field 1, shall be listed in this section.

15. (CR) ***Part Number:*** Part number included in the assembly and items from the engineering and/or manufacturing BOM included in the drawing, DPD, or next level assembly. Typically, these are the part numbers, standard catalogue item numbers, deliverable or embedded software identification, or sub-assembly numbers required to complete the product noted in field 1.

NOTE 1: Include revision level for software listed on the BOM.

NOTE 2: Materials and processes listed on Form 2 do not need to be restated on Form 1.

16. (CR) ***Part Name:*** Name or description of the part number entered in field 15 that is installed in the assembly.

17. (CR) ***Part Type:*** Enter whether the part is a detail part, sub-assembly, software, standard catalogue item, or COTS (or equivalent).

18. (CR) ***FAIR Identifier:*** FAIR identifier (e.g., software generated FAIR identification or number, part number, individual organizational FAIR identification naming conventions) for the detail parts and associated assemblies. If no FAIR identifier is available, input the organization's identifier for the FAI or approved configuration.

19. (R) **Does FAIR Contain a Documented Nonconformance(s)?:** When a nonconformance(s) has been documented in the FAIR, check "Yes" (see 4.5).

20. (R) **FAIR Verified By:** Legible identification of the person verifying the evaluation activities in 4.4 were completed.

NOTE: Electronic identification is acceptable.

21. (R) **Date:** Date when field 20 was populated.

22. (R) **FAIR Reviewed/Approved By:** Legible identification of the person from the organization who reviewed and approved the FAIR. Should not be the same individual identified in field 20.

NOTE: Electronic identification is acceptable.

23. (R) **Date:** Date when field 22 was populated.

24. ***(CR)*** ***Customer Approval:*** Used by customer to record approval.

NOTE: Electronic identification is acceptable.

25. ***(CR)*** ***Date:*** Date when field 24 was populated.

26. (O) Comments: Provide any supporting comments (e.g., associated nonconformance information, identification of associated documentation).

B.3 FORM 2 - PRODUCT ACCOUNTABILITY - MATERIALS, SPECIAL PROCESSES, AND FUNCTIONAL TESTING

Sheet ___ of ___

1. Part Number:	2. Part Name:		3. Serial Number:		4. FAIR Identifier:
5. Material or Process Name:	6. Specification Number:	7. Code:	8. Supplier:	9. Customer Approval Verification:	10. Certificate of Conformance Number:

11. Functional Test Procedure Number:	12. Acceptance Report Number:
13. Comments	

B.4 FORM 2 - PRODUCT ACCOUNTABILITY - MATERIALS, SPECIAL PROCESSES, AND FUNCTIONAL TESTING FORM INSTRUCTIONS

This form is used if any materials, special processes, or functional testing are defined as a design characteristic.

NOTE: Data fields 1 thru 4 are repeated on all forms for convenience and traceability. Any subsequent changes to “data fields” 1 thru 4 need to be made to all pages.

1. (R) **Part Number:** Number of the FAI part [e.g., customer part number contained on the purchasing documents; part number from the associated Bill of Materials (BOM); manufacturer part number for internal parts, when customer part number is not available].

2. (R) **Part Name:** Name of the FAI part.

3. *(CR)* ***Serial Number:*** Serial number of the FAI part; unique identifier assigned to a detail part, sub-assembly, or assembly by the organization or customer.

4. (R) **FAIR Identifier:** Identifier or identification number for the First Article Inspection Report (FAIR).

5. *(CR)* ***Material or Process Name:*** Name of materials (e.g., raw materials, paint, primer adhesives, weld filler) or special processes.

6. *(CR)* ***Specification Number:*** Provide the following information:

   - Material specifications and material form (e.g., sheet, bar) for all materials incorporated into the FAI part (e.g., weld, braze filler).
   - Special process specifications; including class, if applicable, and permitted substitutions.
   - If Commercial-Off-the-Shelf (COTS)/standard catalogue items are modified, then list the non-modified standard hardware or COTS item part number.

     NOTE: Non-modified standard catalogue item(s), when part of an assembly, are listed on Form 1, "Part Number Accountability."

7. (O) Code: Any code specified for the material or process.

8. *(CR)* ***Supplier:*** Identify organization (internal or external) performing special process(es) or supplying material.

   - Name.
   - Address.
   - Code (when available).

9. *(CR)* ***Customer Approval Verification:*** Indicate if the special process(es) or material sources are approved by the customer. Enter "Yes" if approved; "No" if approval is required, but process source is not approved; or "NA" if customer approval is not required.

   NOTE: A "No" would be handled in accordance with 4.5.

10. *(CR)* ***Certificate of Conformance Number:*** The applicable certificate number (e.g., special process completion certification, raw material test report number, modified standard catalogue item compliance report number, traceability number).

11. *(CR)* ***Functional Test Procedure Number:*** Functional Test Procedure number identified as a design characteristic.

12. *(CR)* ***Acceptance Report Number:*** The functional test certification indicating that test requirements have been met.

    NOTE: When software is uploaded as part of a test procedure, record the software and revision level and acceptance report number.

13. (O) Comments: Provide supporting comments, as applicable.

B.5 FORM 3 - CHARACTERISTIC ACCOUNTABILITY, VERIFICATION, AND COMPATIBILITY EVALUATION

1. Part Number:			2. Part Name:			3. *Serial Number:*	4. FAIR Identifier:
Characteristic Accountability				Inspection / Test Results			
5. Char. No.:	6. *Reference Location:*	7. *Characteristic Designator:*	8. Requirement:	9. Results:	10. *Designed / Qualified Tooling:*	11. *Nonconformance Number:*	12. Additional Data / Comments:

B.6 FORM 3 - CHARACTERISTIC ACCOUNTABILITY, VERIFICATION, AND COMPATIBILITY EVALUATION FORM INSTRUCTIONS

This form is used to record inspection results for the design characteristics and to document any applicable nonconformances (see 4.5).

NOTE: Data fields 1 thru 4 are repeated on all forms for convenience and traceability. Any subsequent changes to "data fields" 1 thru 4 need to be made to all pages.

1. (R) **Part Number:** Number of the FAI part [e.g., customer part number contained on the purchasing documents; part number from the associated Bill of Materials (BOM); manufacturer part number for internal parts, when customer part number is not available].

***2.* (R)** **Part Name:** Name of the FAI part.

3. (CR) ***Serial Number:*** Serial number of the FAI part; unique identifier assigned to a detail part, sub-assembly, or assembly by the organization or customer.

4. (R) **FAIR Identifier:** Identifier or identification number for the First Article Inspection Report (FAIR).

5. (R) **Char. No.:** Unique assigned number for each design characteristic.

- The ballooned design characteristic shall clearly be traceable to the characteristic number listed in field 5.
- Automated inspection methods/tooling measurement report/results, shall all be clearly linked to the characteristic number in field 5, ballooned drawing, and associated measurement report/results.

NOTE: A single design callout that applies to multiple characteristics (see 3.16) may be recorded as one characteristic.

6. (CR) ***Reference Location*:** Location of the design characteristic [e.g., drawing zone (page number and section), Digital Product Definition (DPD) model location callout].

7. (CR) ***Characteristic Designator:*** As applicable, a unique identification for special requirements [e.g., Key Characteristic (KC), Critical Item (CI), items requiring additional design or process control] defined by customer (reference 9100 and 9103).

NOTE: See 4.1.c.5.

8. (R) **Requirement:** Specified requirement for the design characteristic (e.g., drawing or DPD dimensional characteristic with associated nominal dimension and tolerances, drawing notes, requirements).

- The organization shall record the requirements in the units (e.g., metric, imperial systems) specified on the drawing or DPD, unless otherwise approved by the customer (see 4.7.3.a).
- The organization shall record the software revision for embedded or deliverable software.

9. (R) **Results:** List measurement(s) obtained for the design characteristics.

The organization shall record the results in the units (e.g., metric, imperial systems) specified on the drawing, DPD, unless otherwise approved by the customer (see 4.7.3.a).

- For multiple characteristics list each characteristic as individual values or list once with the minimum and maximum of measured values attained. If a characteristic is found to be nonconforming, then that characteristic shall be listed separately with the measured value noted.
- When qualified tooling (e.g., radius gauges) is used as a go/no-go gauge (see4.7.3.b), record the results as an attribute (e.g., pass/fail).

- When automated inspection equipment produces measurement results, those results may be referenced on Form 3 identified as pass/fail and attached only when:
  - The characteristic numbers are clearly linked in the attached report [e.g., characteristic identification on Coordinate Measurement System (CMS) report is the same as on this form].
  - The results in the attached reports are clearly traceable to the characteristic numbers.
  - The results are directly comparable to the design characteristic.
- A CMS report only depicting deviation from nominal in multiple axes is not acceptable; the report shall reflect an actual geometric value.
- If a design requirement requires verification testing, record the actual results on the form. If a laboratory report or certificate of test is included in the FAIR, the results may be recorded as an attribute (e.g., pass/fail) and the test reference number recorded on the form. The laboratory report or certificate of test shall show specific values for requirements and actual results.
- For characteristics with visual verification requirements that are rated against standard photographs/master samples/standards; list the unique identifier of the closest comparison. A statement of conformance is acceptable; record the reference number on the forms.
- For processes that require verification per design characteristics, include a statement of conformance (e.g., certification of conformance, verification indicator - accept).
- For characteristics verified by attribute inspection, include statement of conformance (e.g., accept).

10. (CR) ***Designed/Qualified Tooling:*** When design tooling or specially designed tooling, including Numerically Controlled (NC) programming as a media of inspection, is used for attribute acceptance of the characteristic; record the tool identification number. When qualified tooling is used for attribute acceptance, record the gauge value or range (e.g., minimum/maximum value), as applicable.

11. (CR) ***Nonconformance Number:*** If the characteristic is found to be nonconforming, record a nonconformance document reference number.

12. (O) Additional Data/Comments: This area is reserved for optional fields; add additional columns, as required, by the organization or customer.