

# First Article Inspection Policy Number: GQAI 8.2-51

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*Policy Owner(s): Quality*

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## 1.0 Purpose

To provide guideline for conducting and presenting a First Article Inspection (FAI) and / or First Article Test Report (FATR) and responsibilities. The purpose of the First Article Inspection is to provide objective evidence that all engineering design and specification requirements are properly understood, accounted for, verified, and documented. The purpose of this policy is to provide a consistent documented requirement for all First Article Inspection.

The expected result is to reduce future quality escapes, risks, and total costs:

- Help ensure safety of our customers
- Improve quality, delivery, and customer satisfaction
- Reduce costs and production delays associated with product non-conformances
- Identify product realization processes that are not capable of producing conforming product, and initiate and/or validate corrective actions

## 2.0 Scope

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

## 3.0 ISO (QMS) References

Reference Number	Description
ISO 9001:2015	Monitoring and Measurement of Product
AS9102	Aerospace Standard First Article Inspection/Procedure
H003817	Engineering Playbook (Prototypes)
QAF# 0048	HDT FAI Format
GQAI 7.3-1	Engineering Change Process

## 4.0 Definitions

**Certificate of Analysis (C of A)** – A laboratory or otherwise test report providing actual results of testing or examination validating that specified requirements have been met.

**Certificate of Conformance (C of C)** – 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.

The C of C must contain at a minimum following information:

- Customer Name
- HDT Purchase Order Number (PO),
- HDT Part Number and revision level (as stated on the PO),
- Supplier Part Number and revision level, if applicable
- All applicable specifications listed, if not stated on the drawings or specification sheet
- Quantity shipped
- Shelf Life / Expiration Date as applicable.

**Commercial Off The Shelf (COTS) Item** – Part is manufactured for commercial sale and is not part of HDT configuration control.

**Delta First Article** – For revised product first article inspections, only those characteristics which have been revised or changed, since the previous revision, shall be required to be documented on the new First Article Inspection Report.

### **Digital Product Definition (DPD)**

**Engineering Change (EC)** – This relates to the HDT EC process (GQAI 7.3-1) to have traceability and approvals for any changes.

**Engineering Change Proposals (ECP)** – Requests to HDT customer in order to execute a proposed change.

**First Article Inspection (FAI)** – A complete, independent, and documented physical and functional inspection process to verify that prescribed production methods have produced an acceptable item as specified by engineering drawings, specifications and other applicable design documents to contractual purchase order requirements. First Article inspections validate a process that must remain the same, repeatable with no changes without prior written consent of the customer, once submitted and approved.

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

**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.

**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).

### **Quality Assurance Procedure (QAP)**

**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

**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** – A process where some aspects of the required quality cannot be assured by subsequent inspection of the processed material alone.

**Prototype** – Prototypes are early product concepts used to evaluate form, fit or function of an end product.

**Significant Operation** – As deemed by HDT Manufacturing Engineering.

**Prototype First Article Inspection (PFAI)**

**Acceptance Test Plan (ATP)**

**Unless Otherwise Stated (UOS)**

## 5.0 Procedures

### General

An FAI shall be conducted when one or more of the following applies:

- FAI is a contractual requirement
- There is a change to the physical or material makeup of the part
- There is a change to the manufacturing process
- There is a change in supplier or sub-supplier
- There is a change in manufacturing location (Operations approval required)
- The part has not been manufactured or purchased in more than one year

When applicable, HDT must notify the customer of any changes prior to implementation.

- The Sales Order that is entered into SAP will include on a separate line item, indicating FAI is required, defining the quantity as designated by the customer PO. Quality and/or Engineering reserve the right to change the FAI quantity.
- 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.
- 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.
- 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 (QAF 0048) or equivalent.
- 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.
- 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 (QAF 0048) or equivalent for submission to the customer and/or file retention.
- Based on internal or contractual requirements, the HDT Quality Manager, or designee, will define FAI sample size requirements and/or whether a limited or Delta FAI is acceptable.
- In the event the product has not been manufactured or has a lapse in production of one year, an updated first article is required or as deemed necessary by Quality.

## 5.1 Sampling Size

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.

## 5.2 First Article Inspection Package Requirements-Internal Package

The content of a final FAI package may vary however content must include the following, unless otherwise stipulated by the Quality Manager or Engineering Manager:

- 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 by HDT. No external supplier drawings shall be used.**

- A ballooned purchase order or contractual documentation outlining requirements.
- 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.
- 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.
- A copy of the router to demonstrate sequence of operations or method of manufacture at the time the FAI is being performed.
- Any Engineering Change Proposals (ECP) or Approved Request for Variance (RFV) in lieu of meeting contractual requirements.
- Cover page with Customer, Part Number, Revision, Final Approval signatures as deemed required by Quality and/or Engineering.

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.

## 5.3 First Article Inspection Package Requirements – External Packages

### (Customer FAI Requirements and Supplier FAI Requirements)

- 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.**

- A ballooned purchase order or contractual documentation outlining requirements.
- 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.
- 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
- Any Engineering Change Proposals (ECP) or Approved Request for Variance (RFV) in lieu of meeting contractual requirements
- Cover page with Customer, Part Number, Revision, Final Approval signatures as deemed required by Quality and/or Engineering

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

## 5.4 Prototype

- Prototypes are early product concepts used to evaluate form, fit or function of an end 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.
- Prototype FAI will be referenced as PFAI
- Engineering is responsible to prepare and document an FAI on Prototypes (PFAI), unless otherwise agreed with Quality
- Primary approver of Prototype FAI is Engineering, Secondary approval Quality
- It is recommended that Prototypes are conspicuously marked or identified as "Prototype" and or painted a different color as deemed necessary by Engineering
- Prototype FAI's (PFAI) must be retrievable upon Formal FAI submission

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).

## 5.4 Control of changes after FAI validation

Once a Production first article 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 by Quality.

## 5.4 Records: FAI/Validation Package

All FAI, PFAI with substantiating evidence of validation must be saved, retained and available for retrieval.

# 6.0 Responsibilities

## The HDT Quality Manager, or designee

- 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 aforementioned reasons mentioned in 5.1.
- Filing FAI Packages for future retrieval, reference.

## Engineering

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

## Manufacturing Engineering

- Manufacturing Work Instructions
- Process Capability

## The Planner

- 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.

## The Buyer

- 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.

## Inside Sales

- Orders requiring a First Article Inspection are entered into SAP as a separate line item for costing, planning and flowdown 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	Version	Description	Responsible Person
8-9-2019	1.0	Original (Requirements for FAI).	Rita Thomas

## 9.0 Approvals

	Date	Name	Title	PDM Signature
Written & Approved by	–	Suzanne Weber	Corporate Quality Director	–