

First Article Inspection for Suppliers

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*** Note: Scope of application has been restricted ***

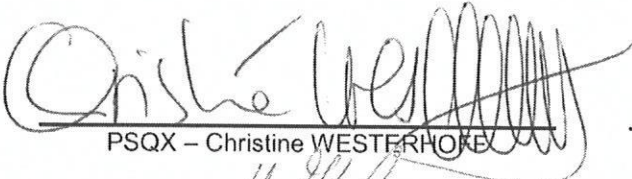
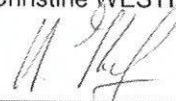

Replacement for:
1. Issue of 29.03.2015

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This work instruction does not apply for transfer of works with a TNF filing date after publication date of this work instruction. For any transfer of work with TNF filing date after publication date of this work instruction applies the respective paragraph of the QV-Z7.4-03-00 (QARAS) and the IAQG Standard 9102.

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Revision status

Issue	Originator	Modified pages	Date	Remark
First Issue	-	-	22.03.2015	-
B	Westerhoff	-	16.03.2020	Scope of application has been restricted

1 Purpose

This Manual defines the activities to be undertaken by the suppliers to meet PAG (Premim Aero-tec GmbH) requirements for the First Article Inspection as requested in internal PAG process EN_03.03.03.04.

The FAI Process including: Planning, Performing, & Reporting is referred in AP2190.3.1 & 3.2 (GRAMS) for customer Airbus Products.

This Manual is applicable to:

- Specified parts, Forgings & Castings
- Aerostructure Items (including Constituent Assemblies, Elementary Parts, Detail Parts):
 - PAG related activities for all Aerostructure items are referred in this manual.

2 Scope

PAG Suppliers

3 Additional Documents

3.1 Additional useable documents

n/a

3.2 Reference Document

EN9102	Aerospace series Quality systems First Article Inspection
EN9103	Aerospace series Quality management systems Variation Management of Key Characteristics

4 Responsibilities

PAG Supplier used for Airbus work orders

5 Glossary

5.1 Terms

see 6.3 Definitions

5.2 Abbreviations

FAI	First Article Inspection
FAIR	First Article Inspection Report

FPQ	First Part Qualification
IPCA+	Industrial Process Capability Assessment
M&P	Materials & Process
MFT	Multi-Functional-Team PAG
MSMA	Manufacturing System Maturity Assessment
PCD	Part Capability Dossier
QCS	Qualification Compliance Sheet

6 First Article Inspection for Suppliers

6.1 Introduction

As per PAG Internal Procedure EN_03.03.03.04, FAI check is a key step of PAG Supply Chain Industrial Qualification Activities.

This manual describes the way of working and provides information and guidance to suppliers on how to carry out First Article Inspection from planning, performance, documentation and reporting of First Article Inspection activities to PAG Supply Chain defined by product groups.

The First Article Inspection is used to demonstrate the ability of a given Manufacturing System to produce conform items in serial mode, in a repeatable manner in accordance with Customer requirement A1016.

A1016 defines two gates and for PAG Supply Chain the two gates consist of:

Gate 1: First Article Inspection (FAI)

The responsible organization for the procured item has to demonstrate it has:

- Understood all requirements and has taken them into account.
- A conformity attestation process able to show evidences (attestation report).
- A process to manage non-compliance to applicable data.

Note: Throughout this manual, the term FAI shall be understood as the Gate 1.

Gate 2: Manufacturing System Maturity Assessment (MSMA)

The responsible organization for the procured items has to demonstrate that the Manufacturing System (production processes and associated competences, production documentation and tooling) is:

- Mature and stable in terms of repeatability and reproducibility.
- Able to ensure serial production phase requirements.
- Able to ensure all items produced comply with the applicable data.

Notes:

- *Activities related to Gate 2 (MSMA: Manufacturing System Maturity Assessment) in accordance with A1016 will be performed via IPCA+ (Industrial Process Capability Assessment) and/or PCD (Process Control Document) as per GRAMS for new contracts.*
- *For Aerostructure items: MSMA is applicable starting with A350 and NEO for CAs and Work Packages in which PAG considers necessary to carry out an IPCA+.*

6.2 Purpose

The purpose of FAI is to give objective evidence that all engineering design and specification requirements are correctly understood, accounted for, verified and recorded.

FAI is the validation of the complete manufacturing process from receipt of purchase order and condition of supply documentation through to certification.

FAI acceptance demonstrates confidence in the reproducibility and maintenance of acceptable quality standards for the production of consecutive parts and activities shall be consistent with the manufacturing and inspection processes used to manufacture the items during technical qualification, in order to validate and freeze the manufacturing route of the technically qualified items.

The FAI is a documented review of the physical and functional processes conducted by the Manufacturer to verify that the production processes, production documentation and tooling are capable of producing parts and assemblies that meet requirements (this includes engineering specification, 3D Models & 2D Drawings, lead-time, ramp-up requirements, purchase orders, convergence to RC cost, and/or other applicable requirements documents).

FAI must also ensure repeatable production by demonstrating repeatability, reproducibility and stability of the Manufacturing System.

FAI shall be performed by the Supplier and may be witnessed by PAG.

FAI report may be used as quality record by PAG as part of New Product Introduction process.

6.3 Definitions

Definition extracted from IAQG standard 9100-2009 and EN9102

Term	Definition
Capability	Ability of an organization, system or process to realize a product that will fulfill the requirements for that product.
Design Characteristics	Those dimensional, visual, functional, mechanical, and material features or properties, which describe and constitute the design of the article as specified by Drawing or DPD Requirements. These characteristics can be measured, inspected, tested, or verified to determine conformance to the design requirements. Dimensional features include in-process locating features such as target-machined (or forged/cast) dimensions on forgings and castings, and, weld/braze joint preparation necessary for acceptance of finished joint. Material features or properties may include processing variables and sequences, which are specified by the drawing or DPD (e.g. heat treat temperature, fluorescent penetrant class, ultrasonic scans, and sequence of welding and heat treat). These provide assurance of intended characteristics that could not be otherwise defined.
Digital Product Definition (DPD) Requirements	Requirements of any digital data files that disclose, directly or by reference, the physical or functional requirements, including data files that disclose the design or acceptance criteria of a product.
Drawing Requirements	Requirements of the drawing (including Parts Lists), specification, or purchasing document to which the article is to be made. These include any notes, specifications, and lower-level drawings invoked.
First Article Inspection Report (FAIR)	The forms and supporting documentation or a part number or assembly, including FAI results, as per this Standard.
First Production Run Parts	The first group of one or more parts that are the result of a planned process designed to be used for future production of these same parts.
Production Process Verification	The organization shall use a representative item from the first production run of a new part or assembly to verify that the production processes, production documentation and tooling are capable of producing parts and assemblies that meet requirements. This process shall be repeated when changes occur that invalidate the original results (e.g. engineering changes, manufacturing process changes, tooling changes). <i>Note: This activity is often referred to as First Article Inspection.</i>
Special Processes	Any processes 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.
Standard Catalog Item	A part or material that conforms to an established industry or national authority published specification, having all characteristics identified by text description, National/Military Standard Drawing, or catalog item.

6.4 Applicability

The FAI is applicable and needs to be carried out on the first item, which has been manufactured, assembled, kitted, processed, weighted and tested in the same manner as intended for serial production of that item.

All parts produced in advance to the first production run or not delivered to PAG shall not be used to perform FAI process.

For applicability to specific spare parts refer to product group related chapters.

The FAI requirements, once invoked, shall continue to apply even after initial compliance. The Supplier shall perform a full FAI, or a partial/delta FAI, for affected characteristics when any of the following events occurs at its own plants or at the plants of its Sub-tiers:

- 1) A change in the design affecting fit, form or function of the part.
- 2) A change in manufacturing source(s), process(es), inspection method(s), location of manufacture, tooling or materials, that can potentially affect fit, form or function.

Note: This includes a change in the tooling location (tools requiring leveling/adjustment in their instalment used in the manufacturing process).

- 3) A change in numerical control program or translation to another media that can potentially affect fit, form or function.
- 4) A natural or man-made event, which may adversely affect the manufacturing process.

Note: This includes personnel changes (e.g. large turnovers) regarding personnel performing production, processing, assembly and inspection tasks as well as charged with the monitoring or control of these tasks.

- 5) A lapse in production for two years or as specified by the customer.

Note: All PAG requirements for Industrial change management are applicable as defined in:

- *GRAMS (AP2190) Module 4, in particular notification to an agreement by PAG prior to any industrial change implementation.*

Following parts are not subject to FAI:

- Parts produced in advance to the first production run and delivered to PAG. These parts shall be 100% inspected.
- Parts designated as specific spare parts not any more in serial production and manufactured as single batch (1-9 parts) are in principle not subject to the FAI process except if specified by PAG. These parts shall be 100% inspected and certified prior to use in accordance with PAG contract or purchase order conditions unless FAI is defined on the purchase order.
- Flight Test Installation Parts. These parts shall be 100% and certified prior to use in accordance with PAG contract or purchase order conditions.

During the FAI process it has to be ensured that for batch fabricated items, the specific item subjected to the First Article Inspection and/or the associated production order is properly identified in order to facilitate traceability. The type of identification to be used is in the discretion of the supplier. The identification must be removed prior to storage and/or delivery of the completed unit.

6.5 Structure of the Document

The document is partitioned in the following main chapters:

6.6 General Way of Working for Conducting FAI by **Supplier**

6.7 Specified Parts, Forgings & Castings

6.8 Aerostructure Products (Incl. Constituent Assemblies, Detail Parts, Elementary Parts)

6.6 General Way of Working for Conducting FAI by Supplier

6.6.1 Planning

If not stated otherwise in the product specific chapter the supplier shall comply with following:

- Perform a FAI planning and agree this planning with PAG *Supply Chain*.
*Note: The planning includes a milestone chart, which includes all applicable criteria within the FAI and those considered as key quality activities.
This accounts for products of sub-tiers as well.*
- Inform PAG Supply Chain 6 weeks prior to the FAI as per PAG Supply Chain may request and have the intention to witness FAI – if not otherwise agreed.

Note: Whenever supplier plans to group or apply a kit/family grouping rule for conducting FAI, this shall be presented to PAG Supply Chain as a proposal for revision & agreement along with the planning.

6.6.2 Performing FAI

The FAI process shall include as a minimum the following:

- Review documentation for the manufacturing process (e.g. routing sheets, manufacturing/quality plans, manufacturing work instructions, etc.) to make sure all operations are completed as-planned.
- Review referenced exhibits supporting the FAI (e.g. inspection data, test data, Acceptance Test Procedures, etc.).
- Review nonconformance documentation (if any) for completeness.
- Review material certifications for compliance (as applicable).
- Verify that approved special process sources for manufacturing and inspection processes are used (as applicable), and that the manufacturing planning/routing documents calls out the correct specification.
- Verify that key characteristic requirements have been met (as applicable).

Notes:

- *For the PAG use of "key characteristics", the definition of EN9103 applies: "The features of a material or part whose variation has a significant influence on product fit, performance, or service life. Key Characteristics for a part, subassembly or system are those selected geometrical, material properties, functional and/or cosmetic features, which are measurable, whose variation control is necessary in meeting Customer requirements and enhancing Customer satisfaction".*
- *When these Key Characteristics can be quantified, the nominal value, allowed tolerance and quantitative results on the product (real value) shall be recorded. When the Key Characteristics measured cannot be quantified the product results shall be recorded as "Conforming" or "Non-Conforming".*
 - Verify that part specific gages and/or tooling are qualified and traceable (as applicable).
 - Verify that every design characteristic requirement is accounted for, uniquely identified and has inspection results traceable to each unique identifier.

Details will be described in the product specific chapters.

6.6.3 Non Conformance Handling

If there is any non-conforming characteristic the supplier shall analyse the cause/s and determine the necessary corrective/preventive action/s to be carried out.

The supplier shall record and justify any deviation related to series production (processes, means, key contributing parties, etc.).

- When the corrective actions are immediately taken and it is possible to check their efficiency on the same FAI process and the FAI is then achieved, this action shall be documented and this characteristic shall be checked again.
- In all other cases, the corrective actions shall be recorded and the FAI is not completed until the supplier closes all non-conformities affecting the part by implementing relevant corrective actions.
- If the supplier is requested to deliver products to PAG in the meantime (before completion of FAI activities), depending on the product group the relevant processes for acceptance of non-conforming items shall be applied. For details refer to product related chapters.
- After the corrective actions have been closed, a partial FAI (linked to the original) has to be performed for checking the efficiency of the corrective actions taken shall be accomplished and documented. In case the magnitude of corrective actions derived from the FAI is excessive in PAG's opinion, PAG shall have the opportunity to require a whole new FAI.

6.6.4 Documentation, Archiving, Reporting

FAI results shall be documented in the FAI Report (FAIR).

FAIR can be documented on any of the following appropriate report forms:

- IAQG Standard 9102 forms.
Note: PAG Quality approval signature on 9102 FAI Report cover page is not mandatory for delivery, except if specified.
- Supplier's own documentation on the undertaking that there is no degradation of PAG requirements and cover sheet in accordance with 9102 forms

All FAI reports and all substantiating data/documentation have to be archived by the Supplier in accordance with QV-Z4.2-05-00.

For each suppliers' partial FAI Report it is mandatory that the reference number of the original FULL FAI is referred.

Depending on the product, PAG will require from Supplier one of the following options:

- Archive FAIR without copy to PAG.
- Declare completion of FAI to PAG (via FAIR ref. or FAIR cover sheet in the delivery document accompanying the 1st delivery of product).
- Send FAIR to PAG for verification

The decision which of the above choices is used, must be written down inside a supplier dossier e.g. IQD (Industrial Definition Dossier).

In case of insufficiencies identified by PAG, PAG reserves the right to request clarification and/or corrective actions.

Note: Supplier shall to be able to provide a copy of the First Article Inspection Report upon PAG request for further investigations/audit purposes, etc. at any time.

6.7 Specified Parts, Forgings & Castings

6.7.1 Planning

Chapter 6.6.1 of current procedure is applicable.

The FAI planning is part of the Qualification Plan as described in GRAMS (*AP2190*) Module 3.2 chapter 3.2.

The supplier shall conduct together with PAG (M&P plus Supply chain specialists) all necessary qualification activities.

In addition, the supplier shall plan the FAI activities according to the qualification schedule and submit the FAI planning to PAG for agreement.

6.7.2 Performing FAI

Chapter 6.6.2 is applicable.

Completed Technical Qualification is pre-requisite for performance of FAI. FAI activities shall be consistent with the manufacturing and inspection processes used to manufacture the items during technical qualification, in order to validate and freeze the manufacturing route of the technically qualified items.

6.7.3 Non Conformance Handling

Chapter 6.6 3 s applicable.

If there is any non-conforming characteristic detected during FAI and if the supplier is requested to deliver products to PAG in the meantime (until completion of FAI activities):

- When non-conformances have no impact on product conformity, products can be delivered if a preliminary QCS (Qualification Compliance Sheet) is released. No additional documentation is required.
- When non-conformances have an impact on product conformity, products can be only delivered if additional non-conformance documentation is provided by the Supplier.

6.7.4 Documentation, Reporting, Archiving

Chapter 6.6.4 is applicable.

Data and FAI results shall be consistent with documented data in the supplier qualification test report.

6.8 Aerostructure Products (Incl. Constituent Assemblies, Detail Parts, Elementary Parts)

6.8.1 Planning

No exceptions to Chapter 6.6.1 of general part.

6.8.2 Performing FAI

No exceptions to Chapter 6.6.2 of general part.

6.8.3 Non Conformance Handling

No exceptions to Chapter 6.6.3 of general part.

6.8.4 Documentation, Reporting, Archiving

Chapter 6.6.4 is applicable.

- *Supplier shall* establish full FAIR for all Constituent Assemblies, Aerostructure assemblies and functional class 1,2 or 3 parts for review to PAG Supply Chain.