

## **CIRRUS AIRCRAFT FAI INSTRUCTION**

### **1. PURPOSE**

The purpose of the first article inspection is to provide objective evidence that all purchase order, engineering, and specification requirements are correctly understood, accounted for, verified, and recorded.

### **2. REFERENCED DOCUMENTS**

Cirrus Supplier Requirements Manual (CSRM001) – Cirrus Design Corporation or Cirrus Aircraft

QAM 10 Inspection and Testing - Cirrus Design Corporation

SAE AS9102 – Aerospace First Article Inspection Requirement

Copies of AS9102 and forms may be obtained from Society of Automotive Engineers at [www.sae.org](http://www.sae.org).

### **3. APPLICABILITY**

**3.1** The Supplier shall submit a full first article inspection report when:

- Manufacturing a production or conforming part for the first time.
- Any engineering change that affects form, fit, function, safety, or reliability is incorporated into the product.
- A production lapse of 2 or more years.
- A natural or man-made event, which may adversely affect the manufacturing process.
- A change in manufacturing sub-tier sources, location, processes, or tooling.

**3.2** The Supplier shall submit a delta/partial FAI report when a production or conforming part has been revised, but engineering form, fit, and/or function has not changed, ex: when a revision changes from A to B.

**3.3** The following items do not require an FAI, unless otherwise directed by CDC:

- Standard Hardware (AN, MS, etc.)
- Commercial “off-the-shelf” items
- Raw materials (bar stock, tubing, plate, etc.)
- Non-metallic materials (sealants, paints, adhesives, etc.)
- Consumable materials

**3.4** First Article Inspection reports for Supplier designed parts called out on Source Control Drawings shall include data to support all the drawing requirements. The vendor qualification and/or Acceptance Test Protocol (ATP) results shall be made available upon request.

**3.5** The Supplier shall flow down the requirements of this instruction and AS9102 to sub-tier suppliers.

#### **4. GENERAL REQUIREMENTS**

**4.1** First article inspection reports shall be documented on the AS9102 forms. Forms with equivalent information may be used. All fields shall be addressed but may be marked as “not applicable” (N/A) if appropriate.

**4.2** When tooling is used to verify a design characteristic, traceability must be established back to the tooling via quality/inspection records. It must be assured that only qualified tooling is used, which has also been subjected to first article verification.

**4.3** The format of the first article inspection report is in three forms. The forms may be completed electronically in a word format (preferred).

Form 1: Part number accountability

- For detail drawings, only sections 1 - 8 are necessary. For assembly drawings with more than one component, complete additional sections.

Form 2: Product accountability – Required for parts and assemblies for which accountability of raw material, special processes and/or functional testing is specified on drawing.

- The report shall include material certifications for all raw materials.

Form 3: Characteristic Accountability, Verification and Compatibility Evaluation – Assign a number to each characteristic and drawing note (same number on form and drawing); it is acceptable to omit reference dimensions and basic dimensions provided adequate GD&T is captured.

Documents that must be included with FAI (in addition to Forms 1, 2, and 3):

- ATR/test records
- Flammability certificates (if specified on engineering drawing for material to meet flammability requirements)
- Material certificates/packing lists
- Special processing certificates (such as anodizing, hard coating, etc.)
- Sub-tier documents or FAI
- Any NCRs/ADRs submitted to Cirrus Aircraft

**4.4** The first article inspection report shall not be considered complete until all non-conformances are resolved. The supplier is to utilize an Advanced Deviation Request form (ADR) to communicate all non-conformances to CDC prior to shipment of product.

#### **5. Common Mistakes**

**5.1** Cirrus part number not used or referenced: the Cirrus Aircraft part number that is on the purchase order should be used throughout the AS9102 forms. The exception is source-controlled parts, in which case, the Cirrus part number needs to be referenced/connected to the supplier part number.

**5.2 NCRs/ADRs not included:** if an NCR/ADR is submitted to Cirrus due to the part or assembly not meeting one or more drawing/engineering requirements, the NCR/ADR must be referenced on Form 3 in the comments section of the discrepant feature. ADRs must be dispositioned “Use As Is (UAI)” to include on FAI. See section 5.6 for further detail.

**5.3 Flammability certificates not included/flammability testing not done:** flammability requirements for a part are defined in the drawing notes. If there is not a call out for flammability requirements, then testing is not needed. Include the flammability testing/certificate information on Form 2, see section 5.5 for further detail.

### 5.5 Form 2 Product Accountability

- Column 5 Material or Process Name:
  - This could be a special process that was performed (ex: “Finish: Zinc plate”) or material used, determined by the Bill of Materials (BOM) on the Cirrus drawing and typically has a Cirrus part number associated with it (ex: BOM says to use “plate aluminum 7050 T7451 – 0.250-1.500 IN” and is defined as part number 53761-001. Use part number 53761-001 in this column).
- Column 6 Specification Number:
  - Materials in the drawing notes or the BOM will have a specification/standard associated with it:
    - Ex: Finish- zinc plate per ASTM-B633, Type II, SC3, put “ASTM-B633, Type II, SC3” into column 6.
    - Ex: BOM calls out material 53761-001, per AMS-4050, put “AMS-4050” into column 6.
- Column 8 Special Process Supplier Code:
  - Record the sub-tier supplier used to provide the special process or material.
- Column 10 Certificate of Conformance Number:
  - Record the PO used to order the special process or material, and ensure the PO is referenced on the C of C from the sub-tier.

### 5.6 Form 3 Results

- Drawing notes:
  - Must be accounted for on Form 3.
  - Results column should state SAT if part meets drawing note/requirement.
  - Results column should state UNSAT if part does not meet drawing note/requirement.
    - In this case, an ADR must be submitted to Cirrus for review. Upon completion, Cirrus will send a discrepancy number to the supplier. The supplier must reference the discrepancy number in the Non-Conformance Number column.
  - Results column should state N/A if the requirement is not applicable to the supplier or is a reference (such as “Electronic file [PN] defines part geometry.”).
- Dimensions:
  - Measure dimensions/GD&T callouts with an appropriate inspection tool and record the result in the Results column. Use a maximum of three decimal places unless otherwise indicated on the drawing.
  - If the tool is calibrated on a regular basis, record the tool number and most recent date of calibration in the Optional Fields column (column 14).

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Form 1: Part Number Accountability

Sheet 1 of \_\_

1. Part Number	2. Part Name	3. Serial Number	4. FAI Report Number
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. P.O. Number
13. Detail FAI <input type="checkbox"/>	14. Full FAI <input type="checkbox"/>	<i>Baseline Part Number including revision level</i> <hr style="border-top: 1px dashed black;"/> <i>Reason for Partial FAI:</i>	
Assembly FAI <input type="checkbox"/>	Partial FAI <input type="checkbox"/>		
a) if above part number is a detail part only, go to Field 19 b) if above part number is an assembly, go to the "INDEX" section below.			

1. Enter Cirrus PN provided on the Purchase Order (PO).
2. Enter Cirrus part name/description provided on the PO.
3. Enter serial number of the part inspected, if applicable.
4. Enter FAI Report Number, this can either be the Cirrus PN or the Supplier's internal process for FAI numbering.
5. Enter part revision level, found on the Cirrus drawing and PO.
6. Enter drawing number: Cirrus PN and supplier PN (if applicable).
7. Enter drawing revision level: Cirrus drawing revision and supplier PN (if applicable).
8. N/A, unless otherwise instructed by Cirrus.
9. Enter Supplier's work order/traveler/job number/lot number for part being built.
10. Enter Supplier Name.
11. Enter the Cirrus supplier number, provided on the PO.
12. Enter the Cirrus PO.
13. Select "Detail FAI" for parts made from a single process, or "Assembly FAI" for an assembly.
14. Select "Full FAI" if part meets the criteria outlined in section 3.1 of this document, or "Partial FAI" if part meets section 3.2. If partial, list reason.

Form 1 continued

<b>INDEX of part numbers or sub-assembly numbers required to make the assembly noted above.</b>			
<b>15. Part Number</b>	<b>16. Part Name</b>	<b>17. Part Serial Number</b>	18. FAI Report Number

15. Enter PNs of sub-assemblies, singular parts, and any COTS parts that are listed on the Cirrus BOM.

16. Enter the part/name description of corresponding part from 15.

17. If applicable, enter serial number of corresponding part from 15, otherwise put N/A.

18. Enter the approved FAI report number of corresponding part from 15, if the part in 15 is a COTS then enter the Certificate of Conformance number.

**If all detail parts/sub-assemblies/COTS parts cannot fit on one page, duplicate a blank page and continue to enter BOM in the index. Ensure that the page number is changed.**

<b>1) Signature indicates that all characteristics are accounted for; meet drawing requirements or are properly documented for disposition.</b>	
<b>2) Also indicate if the FAI is complete per Section 5.4: <input type="checkbox"/> FAI complete <input type="checkbox"/> FAI not Complete</b>	
<b>19. Signature</b>	<b>20. Date</b>
21. Reviewed By	22. Date
23. Customer Approval	24. Date

- Mark FAI complete when all forms are filled in and all documentation is included and correct. FAI is not complete if non-conformances were found during inspection and an ADR has not been submitted/dispositioned.

19. Enter name of personnel completing FAI and signature.

20. Date of completion.

21. Signature of personnel reviewing and accepting FAI (Cirrus completes).

22. Date of accepting FAI (Cirrus completes).

Form 2

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Form 2: Product Accountability – Raw Material, Specifications & Special Process(s)

Sheet 1 of \_\_

<b>1. Part Number</b>	<b>2 Part Name</b>		<b>3. Serial Number</b>		4. FAI Report Number
<b>5. Material or Process Name</b>	<b>6. Specification Number</b>	7. Code	<b>8. Special Process Supplier Code</b>	<b>9. Customer Approval Verification (Yes/No/NA)</b>	<b>10. Certificate of Conformance number</b>

1-4 will be the same as Form 1.

5. Enter raw material or special process name.

6. Enter raw material PN per Cirrus BOM, or the special process number (such as MIL coating).

7. N/A unless otherwise instructed by Cirrus.

8. N/A unless otherwise instructed by Cirrus.

9. N/A unless otherwise instructed by Cirrus.

10. Enter the C of C or PO number that Supplier used to order the material or special process.

- **If all items cannot fit on one page, duplicate blank page and continue. Ensure that the page number is adjusted accordingly.**

<b>11. Functional Test Procedure Number</b>	<b>12. Acceptance report number, if applicable</b>	
13. Comments		
<b>14. Prepared By</b>		<b>15. Date</b>

11. Enter Test Procedure Number if applicable, otherwise mark N/A.

12. Enter Report Number for specific FAI unit or report number for lot of parts where FAI unit was tested if applicable, otherwise mark N/A.

13. Enter any comments, not required.

14-15 will be the same as fields 19 and 20 on Form 1.

**Form 3**  
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Form 3: Characteristic Accountability, Verification and Compatibility Evaluation

Sheet 1 of \_\_\_

1. Part Number			2. Part Name			3. Serial Number	4. FAI Report
<b>Characteristic Accountability</b>			<b>Inspection / Test Results</b>			<b>Optional Fields</b>	
5. Char No.	6. Reference Location	7. Characteristic Designator	8. Requirement	9. Results	10. Designed Tooling	11. Non-Conformance Number	14. [Insert columns, etc, as required by Organization or Customer]

1-4 will be the same as Form 1.

5. Number identified on the Balloon/Bubble drawing. Ensure that the drawing notes also have assigned characteristic numbers.
6. Location of characteristic on Cirrus drawing, such as "Sheet 1 zone B4", "Sheet 2 zone D1".
7. Characteristic designator is for key designators, such as flight safety.
8. Enter the listed requirement on the drawings.
  - a. For notes, it is acceptable to simply put "Note #".
  - b. For dimensions or variables, enter the requirement and tolerance. Ex: 2.000 +/- 0.050; if dimension is a reference, put REF in place of the tolerance: 2.000 REF
9. Result of measurement/evaluation from box 3.
  - a. For Notes, put SAT if condition has been met, UNSAT if condition has not been met (see 14 for further instructions in this case), or N/A.
  - b. For dimensions or variables, enter the resulting measurement. Even if the dimension is a REF, measure the dimension and record the result.
  - c. If the measurement of a dimension/variable is out of tolerance, the Supplier must contact Cirrus immediately and submit an Advanced Deviation Request (ADR) for Cirrus engineering to evaluate and accept or reject. Once Cirrus engineering has dispositioned the non-conformance, the resulting AS9103 form and non-conformance number will be sent to the Supplier. The Supplier will then enter the non-conformance number in box 11.
10. For dimensions/variables, enter the type of inspection equipment used (caliper, CMM, height gage, video comparator, FARO arm, etc.). For Notes, make as Visual, Reference, Documentation, or type of inspection/test equipment if applicable.
11. Enter non-conformance number from Cirrus if a result did not meet the requirement. **Non-conformances must be evaluated by Cirrus/corrected by supplier before FAI can be accepted.**
14. For inspection tools used, enter the tool/equipment's identification number (from Supplier) and calibration due date. For Notes accepted by documentation, list report/document number.