

# AS9102 First Article Inspection

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## AS9102 First Article Inspection

Many organizations in the aerospace and defense industry require a **First Article Inspection Report (FAIR)**. 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 AS9102 Standard establishes documentation requirements for the First Article Inspection (FAI). The purpose of this standard is to provide a consistent documentation requirement for aerospace components First Article Inspection. Some customers also flowed down the AS9102 requirements to non-aerospace parts as well.

It is intended that the documentation generated on the first article inspection will be a quality record of the supplier and the customer for review of accountability and planning, for performing periodic surveillance and audits to verify conformance, for evaluating root cause and corrective action for any non-conformances, and for problem investigations. Hence, the completeness and accuracy of the record is critical.

**NOTE:** AS9102A has been superseded by AS9102B as of October, 2014. According to 4.7.1.d of AS9102B, use of forms from a previous 9102 standard revision (e.g. AS9102A) is acceptable, provided the current form's [AS9102B] instructions are utilized.

### Guidelines for completing the AS9102 form:

It is strongly recommended that suppliers should obtain a copy of the Standard. A set of blank forms comes as an appendix with the purchased Standard. Please note these hints presented herein are intended as supplemental information to the guidelines published in the AS9102 Standard. For the conditionally required and optional fields on the Standard, Transtector may specify them as required and/or conditionally required fields due to flow downs from our customers. Therefore, what Transtector requires on the FAIR may differ from your other customers.

The AS9102 First Article Inspection Report comprises of three forms. Additional sheets should be used as needed. It is important to note that a FAIR package should always have the 3 forms and with no exception to partial FAIR.

**AS9102 B Form 1: Part Number Accountability** shall be used to identify the part that is being first article inspected (FAI part) and associated sub-assemblies or detail parts.

**AS9102 B Form 2: Product Accountability – Material, Special Process, and Functional Testing** shall be used if any material, special processes or functional testing are defined as a design requirement.

**AS9102 B Form 3: Characteristic Accountability, Verification and Compatibility Evaluation** shall be used to record an actual measurement or inspection/verification of the FAI part for every design characteristic on the drawing, including the notes on the drawing.

The input fields on the forms fall into the following 3 categories – Required, Conditionally Required, and Optional.

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- **Required:** meaning this is mandatory information. It is depicted in **Bold** font on the form.
- **Conditionally Required:** meaning this field must be completed when applicable or as required by Transtector. It is depicted in **Bold Italic** font on the form.
- Optional: meaning information is required when available or as specified by Transtector. It is depicted in Regular font on the form.
  - In this guideline, the box # of Required fields are highlighted in RED and the Optional fields are highlighted in YELLOW for better reading visibility.
  - Please note we have designated several “optional” fields as “required” to meet our and/or our customers’ requirements.

GENERAL NOTES for all 3 forms:

1. Boxes 1 – 4 are repeated on all 3 forms for convenience and traceability. The entries shall be the same for all 3 forms. Any subsequent changes to “data fields” 1 thru 4 need to be made to all pages.
2. Boxes that do not have an entry should be “N/A”.
3. Do not use ditto mark or draw a line/arrow down for duplicate entries.
4. The words “our, we, or customer” used in this tip sheet refer to Transtector.
5. The words “you, yours, supplier” used in this tip sheet refer to the supplier who submits the AS9102B FAI forms.
6. The hints for the entries herein are written based on Transtector’s requirements/specifications. Your other customers may have a different requirement on how they want their AS9102B FAIR filled out.
7. The AS9102B FAIR needs to be submitted with the first article. Computer printed outs are preferred over hand written ones.
8. For the “Reviewed by” and “Signature” fields, electronic identification and signature are both acceptable.

### Form 1:

**Box 1** Part Number of the first article part (FAI)

**Box 2** Name of the part as shown on our drawing. Typically, it is the part description in the title block of the drawing.

Box 3 Serial Number of the FAI. Depending on the product, you may or may not have a series number.

Box 4 Reference number that identifies the FAI. It can be your internal report number but it needs to be a unique number for the first article.

*(Note: Entries in Boxes 1 – 4 on Form 1 are repeated on all 3 forms.)*

Box 5 The revision of the part being first article inspected. The revision level can be found in the title block of the drawing. If there is no revision, indicate as such.

Box 6 The drawing number associated with the FAI part.

Box 7 Reference the drawing revision level. Most of time, it is the same as in Box 6.

Box 8 Reference design, Engineering or manufacturing changes affecting the FAI part, not reflected by the current part/drawing revision level. This will be N/A in most cases.

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**Box 9** Reference your internal order.

**Box 10** Your company name unless you contracted your FAI to another company. This is extremely rare.

**Box 11** The supplier number given by Transtector. It can be found on the Purchase Order.

**Box 12** Input the Purchase Order number.

**Box 13** Check one of the two boxes as appropriate.

**Box 14** Check as appropriate. For partial FAI, include the reasons why this is a partial instead of a full FAI. Drawing revisions, change of manufacturing location, non-conformance found in the prior Full FAI, & etc. could be some of the reasons.

*(Box 15, 16, 17 & 18 are required if the part number in Box 1 is an assembly with lower level parts. Enter "N/A" as appropriate. If entries are necessary, refer to the followings:)*

Box 15 Reference all lower level parts or sub-assembly part numbers.

Box 16 Part name as shown on the drawing/part list.

Box 17 Reference the serial number of the part.

Box 18 A reference number that identifies the FAI package.

**Box 19** The person who prepared the FAI should print his/her name and sign this box.

**Box 20** Date when the FAI was prepared.

**Box 21** The name of the person who reviewed or approved the FAI package (i.e. for all 3 forms)

**Box 22** Date when the FAI package was reviewed.

**Box 23** Leave this blank for Transtector.

**Box 24** Leave this blank for Transtector.

## Form 2

**Box 1** Part Number of the first article part (FAI)

**Box 2** Name of the part as shown on our drawing.

Box 3 Serial Number of the FAI.

Box 4 Reference number that identifies the FAI.

*(Note: Entries in Boxes 1 – 4 should be the same as what are in Form 1. Refer to general notes #1.)*

Box 5 Enter the name of the material or process (one per line). E.g. Aluminum, Brass, Electro plating, Painting, Power Coating, Heat Treating, etc.)

Box 6 Enter the material or process specification number, class and material. E.g. ASTM-B16 BRASS, MIL-STD-G-45204, 7075-T651 Al per ASTM-B211, Clean per ASTM-D-2651, etc.

**Box 7** Reference any material code specified.

Box 8 Reference Special Process Vendor code

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Box 9 Indicate if technical approval is required by the customer.

Box 10 Reference the report number of the Certificate of Conformance (CoC) or Certificate of Analysis (CoA), Lab report, etc. The report referenced need to be attached at the end of the FAIR.

Box 11 Reference the Functional Testing procedure as stated on the drawing.

Box 12 Reference the Functional Test report number. The report referenced need to be attached at the end of the FAIR.

Box 13 Comment as applicable

Box 14 The name of the person who prepared Form 2. This can be a different person than the one who completed Form 1.

Box 15 Date when Form 2 is completed.

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## Form 3

General notes for Form 3:

- > Depending on the number of characteristics, a second sheet may be needed. If more one sheet is used, fill in the sheet \_\_ of \_\_.
- > Due to the requirement/recommendation from most of our customers, Transtector has subdivided the optional Box 14 of the standard form into two columns Box 15 and Box 16.

**Box 1** Part Number of the first article part (FAI)

**Box 2** Name of the part as shown on our drawing.

Box 3 Serial Number of the FAI.

Box 4 Reference number that identifies the FAI.

*(Note: Entries in Boxes 1 – 4 should be the same as what are in Form 1. Refer to general notes #1.)*

**Box 5** Assign a unique number for each design characteristic. The number must match what is on the ballooned drawing. The illustrations over the next few pages are examples of how the characteristics identified on the drawing are “balloon marked” and their inspection results documented in Form 3.

Box 6 Reference the drawing zone. When coordinates such as A-2, D-3 are printed on the drawing, use the coordinates otherwise use the drawing sheet number(s).

Box 7 Reference any zoned characteristics such as Key Characteristics, Safety Critical Characteristics, etc. otherwise enter “N/A”.

**Box 8** Indicate the specified or drawing requirements – dimensional features with the tolerances, drawing notes, specification requirement, etc.

**Box 9** Enter the measurement obtained for each characteristic.

- Multiple characteristics shall be listed as individual values or with the minimum and maximum of measured values attained. (NOTE: Our drawing typically uses “X” for the multiples - E.g., 2X  $\varnothing$  .250, 4X .465”)
- If a characteristic is found to be nonconforming, then that characteristics shall be listed separately with the measured value noted. Entries in Box 9 contains some examples.

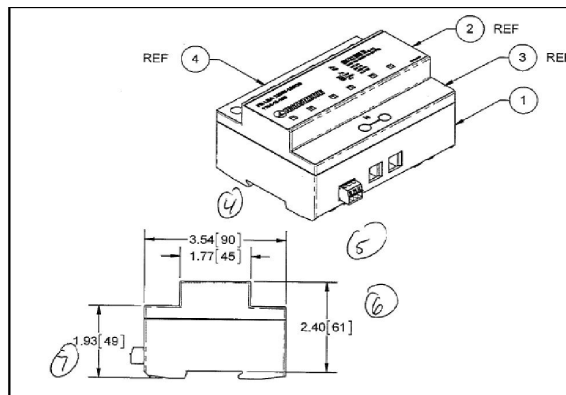
Box 5	Box 6	Box 7	Box 8	Box 9
1	A2	N/A	< 60DEG +/-1DEG	60 DEG
2	A2	N/A	$\varnothing$ .56” +/- .01	0.565”
3	A3	N/A	.130” +.005/-0	0.1325”
4	D3	N/A	14.028” +/- .005	14.0247”
5	D3	N/A	<45DEG +/-1DEG	45 DEG
6	D3	N/A	3X .02” +/- .01	2X.03” , .04”

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7	D3	N/A	3.10" +/- .01	3.099"
8	D3	N/A	Ø .9370" +0/- .0003	0.9368"
9	Sh 1	N/A	2X Ø .250"	.250", .251"
10	Sh 2	N/A	4X .465" +/- .005	.466"-.469"

- Processes that require design verification must have statement of compliance recorded on the form (use words such as "PASS", "PASSING", "ACCEPT", NOT PAINTED, MASKED OFF, etc.)
- Laboratory reports or Certificate of test must show specific values for the requirements and actual results.

Box 10 Record the tool identification number used for the inspection of that particular characteristics.



Characteristic Accountability			Inspection / Test Results			Inspection Method / Comments		
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) 15. Insp. device	16. Remarks
1	Note 1	N/A	Interpret dimensions and tolerances per ASME Y14.5-2009	Pass	N/A	N/A	N/A	N/A
2	Sht 1	N/A	4.96	Pass / 4.969	6698	N/A	calipers	cal 3/7/11 due 3/7/12
3	Sht 1	N/A	2.60	Pass / 2.602	6698	N/A	calipers	cal 3/7/11 due 3/7/12
4	Sht 1	N/A	3.54	Fail / 3.558	6698	N/A	calipers	cal 3/7/11 due 3/7/12
5	Sht 1	N/A	1.77	Pass / 1.768	6698	N/A	calipers	cal 3/7/11 due 3/7/12
6	Sht 1	N/A	2.40	Pass / 2.40	6698	N/A	calipers	cal 3/7/11 due 3/7/12
7	Sht 1	N/A	1.93	Pass / 1.939	6698	N/A	calipers	cal 3/7/11 due 3/7/12
Tolerances: Fractions + +/- 1/32, Angles = +/- 1°, XX +/- .01, .XXX .005								
The signature indicates that all characteristics are accounted for; meet drawing requirements or are properly documented for disposition.								



In the illustration above, the tolerances are in a summarized format and entered on the bottom line of the form. However, it may be easier to include the tolerance with each individual requirement if the tolerances are not the same for all the requirements.

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- All drawing notes requirements must be accounted for or acknowledged by assigning a “balloon” number.

Drawing notes are part of the requirements / parameters / features to be inspected or verified. The results are to be reported on Form 3.

Depending on the type of inspection, the input for the results (cells under columns 8) can be a “YES” or “PASS” to confirm that the requirement has been met. The corresponding cells under column 15 can be “VISUAL” if it is inspected visually, “STD COLOR CHART” if the color was verified using a color standard & etc



NOTES:		
⑦	1.	INTERPRET DIMENSIONS AND TOLERANCES PER ASME Y14.5-2009.
⑧	2.	THIS DRAWING SHALL BE USED WITH MODEL 2001-382 REV C STEP FOR COMPLETE PRODUCT DEFINITION. INTERPRET PRODUCT DEFINITION DATA SET PER ASME Y14.41-2003.
⑨	3.	INSTALL ALL HARDWARE AFTER POWDERCOAT OPERATION OR MASK BEFORE POWDERCOAT.
⑩	4.	FINE TEXTURED POWDER COAT RAL7035. REFERENCE TRANSECTOR STANDARD DOCUMENT 1201-044 FOR COATING AND PAINTING SPECIFICATIONS.
⑪	5.	INSPECTION OF DIMENSION REQUIRED.
⑫	6.	MASK ALL HATCHED AREAS INDICATED.
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Box 11 Record non-conformance document reference number found with the previous first article (i.e. if the current FAI is a partial FAI).

**Box 12** The name of the person who prepared Form 3. This can be a different person than the person who completed Form 1 or Form 2).

**Box 13** Date when Form 3 is completed

Box 14 The Standard left this as an optional field for customer to designate any requirements as needed.

*TRANSECTOR has subdivided this into two columns – 15 and 16.*

**Box 15** Describe Inspection, Measuring & Test Equipment used for first article inspection (such as dial gages, indicator micrometer, calipers, height gages, etc.).

**Box 16** Enter the cal/cert date of the inspection tools

## Most Common Reasons for FAIR Rejection

- Missing FAI Reports or Test Reports for sub-assemblies and/or fabricated detail parts.
- Missing signatures, dates.
- Missing or incorrect information provided.

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- Missing special processor full address on AS9102 B Form 2, box 8.
- Missing tolerances on AS9102 B Form 3, box 8.
- Not meeting customer flow down requirements.
- Not providing the numerical inspection results when the requirement from the engineering drawing is in variable data.
- Cert of Analysis (CoA), Cert of Compliance (CoC) not submitted with the FAIR
- FAIR package does not have all 3 of the forms.
- Entries on the forms are not legible.