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| <b>OPERATING PROCEDURE</b>         |   | <b>OP 10.3</b>  | Revision: D<br>Page 1 of 17 |
| <u>Quality Assurance</u>           | <br><b>BREEZE • EASTERN</b><br><i>Be Ready. Be Sure.</i> | <u>06/13/06</u> | <u>08/04/11</u>             |
| Controlling Department             |   | Issue Date      | Revision Date               |
| Subject: FIRST ARTICLE INSPECTIONS |   |                 |                             |

## FIRST ARTICLE INSPECTIONS

Notes: Compliant With AS 9102A:2004

Approvals:

Product Engineering  
And Program  
Management

Print Andy Midkiff Signature  Date: 8/19/11

C.F.O & Treasurer

Print N/A Signature N/A Date: \_\_\_\_\_

Human Resources:  
Customer

Print N/A Signature N/A Date: \_\_\_\_\_

Connections:

Print N/A Signature N/A Date: \_\_\_\_\_

Customer Care

Print N/A Signature N/A Date: \_\_\_\_\_

Operations:  
Quality Improvement  
& Completeness:

Print Rodger W. Hahneman Signature  Date: 11/10/11

Print Lars Novak Signature  Date: 11/11/11

FAA:

Print N/A Signature N/A Date: \_\_\_\_\_

Quality Assurance:

Print Alan Moss Signature  Date: 9/16/11


Purchasing:

Print David Moeller Signature  Date: 8/4/11

Author:

Print Norman Harris Signature  Date: 8/4/11

Release Date (initial/date) YC 12/5/11

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**PURPOSE:**

- 1.1 The purpose of this document is to provide objective evidence that all engineering design and specification requirements are understood, accounted for, verified and documented.

**2.0 SCOPE:**

- 2.1 This procedure applies to all levels of parts within an assembly, including castings and forgings, and to organizations that are responsible for producing the product per the design documentation. This requirement applies to Breeze-Eastern and its sub-tier suppliers for products which are new, changed, either in design, manufacturing site, processes (including numerical control programs or media transfer) or supplier in such a way that it affects form, fit or function, natural or man-made event (which may affect manufacturing process) or a lapse in production of two years or as specified by the customer.
- 2.2 All products, for which first article inspection are needed or required by contract or regulation, shall conform to the requirements of this procedure. Procured standard catalog hardware (standard parts) is excluded from this requirement.

**3.0 REFERENCES & DEFINITIONS:**

- 3.1 OP 10.1 – Inspection and Testing
- 3.2 OP 11.1 – Control of Inspection Measuring and Test Equipment
- 3.3 OP 13.1 – Control of Nonconforming Materials and Processes
- 3.4 OP 14.1 - Corrective and Preventive Action
- 3.5 OP 16.1 – Control of Records
- 3.6 OP 17.1 – Compliance Evaluation Audits
- 3.7 OP 18.1 – Training Program
- 3.8 QP-137 – Purchase Order Quality Codes



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- 3.9 QC-1351 Part Number Accountability
- 3.10 QC-1352 Product Accountability – Raw Material Specifications & Special Process(es) and Functional Testing
- 3.11 QC-1353 Characteristic Accountability Verification and Compatibility Evaluation
- 3.12 AS9102A:2004 – Aerospace First Article Inspection Requirement.
- 3.13 NIST – National Institute of Standard & Technology
- 3.14 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 (for example, go/no-go, accept/reject, pass/fail, etc.). Attribute data may be used if no inspection technique using variable data is feasible. Attribute data is also allowed when specific numerical limits are not specified (e.g., break all sharp edges).
- 3.15 Characteristic Designator – The identification of type of characteristic being measures (e.g., key, critical, major, etc.).
- 3.16 Deliverable Software – Embedded or loadable airborne, space borne or ground support software components that are part of an aircraft Type Design, weapon system, missile or spacecraft.
- 3.17 Design Characteristics – Those dimensional, visual, functional, mechanical, and material features or properties, which describe and constitute the design of the article as specified the drawing. These characteristics can be measured, inspected, tested, or verified to determine conformance to the design requirement. Dimensional features include in-process locating features such as target-machined (or forged/cast) dimensions or forgings and casting, and, weld/braze joint preparation necessary for acceptance or finished joint. Material features or properties may include processing variables and sequences, which are specified by the drawing (e.g., heat treat temperature, fluorescent penetrant class, ultrasonic scans, and sequence of welding and heat treat).



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- 3.18 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.
- 3.19 Drawing Requirement – Requirements of the drawing including parts lists, specifications, or purchasing document to which the article is to be made. These include any notes, specifications, and lower-level drawings invoked.
- 3.20 First Article Inspection – 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. Purchase Order requirements apply, as well, for purchased items.
- 3.21 First Article Inspection Report – The documented result of the FAI performed in accordance with this procedure (QC 1351, QC 1352 & QC 1353). An alternate supplier form providing the equivalent data is acceptable.
- 3.22 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. Prototype parts, or parts built using methods different from that intended for the normal production process shall not be considered as part of the first production run.
- 3.23 Inaccessible Characteristic – A characteristic that cannot be evaluated at any time after it is generated without destroying the part. Inaccessible dimensions may include internal dimensions of castings, internal dimensions of a welded or brazed assembly which are called out for the assembly. Inaccessible non-dimensional characteristics include material strength, certain metallurgical features and manufacturing processes, including nondestructive testing.
- 3.24 Multiple Characteristics – Identical characteristics that occur at more than one location (e.g., “4 Places”) but are established by a single set of drawing requirements (e.g., rivet hole size, dovetail slot, corner radii, chemical milling pocket thickness).
- 3.25 Product – The result of a process, which includes finished detailed parts and assemblies. This also includes forgings and castings.



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- 3.26 Inspection – Examination of an object to determine whether it conforms to standards, applicable engineering specifications, etc. Inspection applies to attributes, measurement produces variable data, and testing can produce variable or attribute data. “First Article Inspection” is used for all of these measurements.
- 3.27 Reference Characteristics – The characteristics that are used for “information only” or to show relationship. These are dimensions without tolerances and refer to other dimensions on the drawings. Reference characteristics may be omitted from the FAI.
- 3.28 Standard Catalog Hardware – 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.
- 3.29 Variable Data – Quantitative measurements taken on a continuous scale. For example, the diameter of a cylinder or the gap between mating parts. Variable data shall be used unless no other inspection technique is feasible, then attribute data may be utilized. Attribute data is also allowed when specific numerical limits are not specified (e.g., break all sharp edges).
- 3.30 Prototype Parts – Parts manufactured using methods different from those intended for the normal production process. Prototype parts shall not be used for FAI purposes.
- 3.31 All first article inspection reports, including hand-written data, taken during the inspection shall be maintained on file by Breeze-Eastern Inspection/ Quality and/ or the supplier (where applicable), in accordance with the requirements of OP 16.1. These records may be stored electronically in a controlled and secure environment or in another media form other than paper. Where required by contract or regulatory authority, these reports will be made available for review.
- 3.32 Where contract or regulatory requirements are specified for first article inspections which differ from those set forth herein, those requirements shall take precedence over this procedure. The format of the report shall be in agreement with the requirements of AS 9102A:2004 or this procedure and remain as




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described unless specified by contract. Additional regulations may be added as necessary to meet B-E or customer / regulatory requirements.

- 3.33 All design and drawing characteristics, notes or special requirements noted on the FAIR form must be accepted without exception. Any out-of-tolerance or out-of-specification condition shall be considered a non-conformance and documented per OP 13.1. The non-conformance(s) shall be resolved and corrective action established per OP 14.1 before acceptance of the first article can occur.
- 3.34 A FAIR shall be required and maintained for all tooling, fixtures, gages or jigs built to support B-E products and shall be on file at the supplier for supplier built items or at B-E for B-E built items per the requirements of OP 16.1.
- 3.35 Where complete or higher level sub-assemblies are purchased from a supplier, the First Article Inspection shall be performed to the top level drawing of the supplied part/assembly. All subassembly, piece part levels and purchased parts provided by the supplier as a part of the delivered part/assembly shall have a FAIR generated and on file at the supplier. This requirement is identified by the Quality Clause 59 of QP-137.
- 3.36 Parts which have been identified on the Purchase Order as requiring a FAI shall be shipped with a copy of the FAI to Breeze-Eastern without benefit of the Certified Supplier or Source Inspection Process. This is to assure that the items are sent to Receiving Inspection for review.

#### **4.0 REGULATIONS & RESPONSIBILITIES:**

- 4.1 Engineering is responsible for providing design documentation that fully defines the product, including all the required design characteristics.
- 4.2 Quality Control Inspection is responsible to perform and approve all FAIR requirements for Breeze-Eastern in-house manufactured products.
- 4.3 Quality Engineering is responsible to review and approve submitted FAIs from suppliers.
- 4.4 Suppliers are responsible for performing a FAIR for all supplied parts/assemblies, including all parts/assemblies used in the end item.

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4.5 Suppliers are responsible to flow-down this requirement to sub-tier contractors.

## 5.0 PROCEDURE:

- 5.1 Upon release of a new (First Production Run) or revised product, change of manufacturing location, processes, materials and when required by Breeze-Eastern, a first article inspection report shall be generated. The format of this report shall comply with the requirements of AS 9102A:2004 or take the following form:
- 5.1.1 For the part being inspected, identify the parts and any sub-assemblies on Form QC-1351, Part Number Accountability or the AS 9102A:2004 equivalent.
  - 5.1.2 The identification of raw material specifications, special process(es) and functional testing shall be recorded on Form QC-1352, Raw Material Specifications and Special Process(es) and Functional Testing or the AS 9102A:2004 equivalent.
  - 5.1.3 All characteristics listed on the released final print for the product shall be identified on the Form QC-1353, Characteristic Accountability Verification and Compatibility Evaluation or the AS 9102A:2004 equivalent.
- 5.2 All characteristics shall be numbered and uniquely identified to the final print by marking the print with the character number.
- 5.3 The Design Characteristic shall be defined on the Form QC-1353, including the dimensional characteristics with nominal and tolerances included, drawing notes, specification requirements, notes, etc.
- 5.4 Special requirements listed on the print specification shall be included on Form QC-1352.
- 5.5 Process certifications utilized as evidence of conformance shall be verified against the applicable standard(s) to additionally determine conformance.





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- 5.6 Inaccessible characteristics shall be validated through lower level FAIRs conducted during the manufacturing process. These lower level FAIRs should be listed on Form QC-1351.
- 5.7 Material certifications utilized as evidence of conformance shall be verified against the applicable standard(s) to additionally determine conformance.
- 5.8 Manufacturing travelers, routing sheets and work instructions (routings) supporting operations performed during the manufacturing process shall be retained as part of the FAIR documentation package and maintained in accordance with OP 16.1.
- 5.9 Product Acceptance Test Procedures and the data sheets shall be identified on Form QC-1352 and retained as part of the FAIR documentation package in accordance with OP 16.1.
- 5.10 Inspections and tests performed as part of a Quality or Manufacturing Procedure/ Work Instruction shall be retained as part of the FAIR documentation package and maintained in accordance with OP 16.1.
- 5.11 Where required by contract or regulatory authority, all associated process and material certifications shall be included in the FAIR package. Suppliers performing an FAIR that is required to be forwarded to Breeze-Eastern shall include copies of all associated process and material certifications. Any additional contract requirements shall be listed on the FAIR form.
- 5.12 Parts being submitted for FAI should be randomly selected from the lot of products under inspection. Inspections shall be in accordance with OP 10.1.
- 5.13 Following the completion of the inspection/evaluation, the inspector will approve/disapprove the FAIR based upon the inspection results. This approval shall take the form of a signature, and the inspector's stamp being applied to the completed forms.
- 5.14 A FAIR with a non-conformance shall not be approved until all non-conformances have been documented per OP 13.1 and resolved in accordance with the requirements of OP 14.1.



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- 5.15 Completed FAIR packages will be reviewed, approved and stored by Quality Control Inspection for items completed by Breeze-Eastern. Quality Engineering will review, approve and store items completed by the supplier at the part-number level specified on the applicable purchase order. The supplier will also store FAIR packages, including all lower-level subassembly, piece part and purchased parts provided within the part purchased by Breeze-Eastern. Storage may be by utilizing electronic copies of the signed FAIR. Records retention shall be in accordance with OP 16.1.
- 5.16 Training for the First Article Inspection procedure shall be accomplished in accordance with OP 18.1.
- 5.17 The First Article Inspection process shall be subject to audit in accordance with the requirements of OP 17.1.



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## APPENDIX B

### Instructions to complete Form QC-1351, Part Number Accountability

Note: Fields 1 – 4 are repeated on all FAIR forms. R designates Required Information, CR designates Conditionally Required information (when applicable), and O designated Optional information provided for convenience.

- |  |    |  |
|--|----|--|
| 1  | R  | <b>Part Number:</b> Number of the part (FAI part).   |
| 2  | R  | <b>Part Name:</b> Name of the part as shown on the drawing.  |
| 3  | CR | <b>Serial number:</b> Serial number of the part.   |
| 4  | O  | <b>FAI Report Number:</b> Reference number that identifies the FAI. This maybe an internal report number.  |
| 5  | CR | <b>Part Revision Level:</b> Latest part revision that affects the part being first article inspected. If there is no revision, indicate as such. Note: The latest drawing revision does not always affect all parts contained on a drawing.  |
| 6  | CR | <b>Drawing Number:</b> Drawing number associated with eh FAI part.   |
| 7  | CR | <b>Drawing Revision Level:</b> The revision level of the engineering drawing. If there is no revision, indicate as such.   |
| 8  | CR | <b>Additional Changes:</b> Provide reference numbers(s) of any changes that are incorporated in the product but not reflected in the referenced drawing/part revision level (e.g. change in design, engineering change orders, manufacturing changes, deviations or exclusions from certain drawing requirements, etc.). |
| 9  | R  | <b>Manufacturing Process Reference:</b> A reference number that provides traceability to the manufacturing record of the FAI part (e.g., router number, manufacturing plan number, etc.).  |
| 10   | R  | <b>Organization Name:</b> Name of the Organization performing the FAI.   |
| 11   | O  | <b>Supplier Code:</b> Supplier Code is a unique number given by Customer to the Organization. It is sometimes referred to as Vendor Code, Vendor Identification Number, Supplier Number, etc.  |
| 12   | O  | <b>P.O. Number:</b> Enter Customer Purchase Order number, if applicable or required.   |
| 13   | R  | <b>Detail part of an assembly FAI:</b> Check as appropriate.   |
| 14   | R  | <b>Full FAI or Partial FAI:</b> Check as appropriate. Far a partial FAI, provide the baseline part number (including revision level) to which the partial FAI is performed and the reason for it. For example, changes I design, process, manufacturing location, etc.   |
| 15, 16, 17 and 18: This section is required only of the part number in Field 1 is an assembly requiring lower level parts to be installed into the assembly. |    |  |
| 15   | CR | <b>Part Number:</b> Detail or next level sub-assembly part number to be included in the assembly.  |
| 16   | CR | <b>Part Name:</b> as shown on the drawing.   |
| 17   | CR | <b>Part Serial</b> Number of the part that is installed in the assembly, when applicable.  |
| 18   | O  | <b>FAI Report</b> Number of the detail part  |



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- 19    R        **Signature:** Name and signature of the person who prepared FAI Form QC-1351. Also check appropriate box if this FAI is complete with no open or outstanding non-conformances.
- 20    R        **Date** when this FAI form was prepared.
- 21    O        **Name** of the person from the organization who approved the FAI report.
- 22    O        **Date** when the FAI report is approved.
- 23    O        **Customer Approval:** This field is used by the Customer to record approval, if required.
- 24    O        **Date** Customer approved this FAI form.





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APPENDIX D


Instructions to complete Form QC-1352, Product Accountability –  
Raw Material Specifications & Special Process(es) and Functional Testing

Note: Fields 1 – 4 are repeated on all FAIR forms. R designates Required Information, CR designates Conditionally Required information (when applicable), and O designated Optional information provided for convenience.

- 1 R **Part Number:** Number of the part (FAI part).
- 2 R **Part Name:** Name of the part as shown on the drawing.
- 3 CR **Serial number:** Serial number of the part.
- 4 O **FAI Report Number:** Reference number that identifies the FAI. This maybe an internal report number.
- 5 CR **Material or Process:** Enter the name of the material or process.
- 6 CR **Specification:** Enter the material or process specifications number (including permitted alternates, if used), class, and material form (e.g., sheet, bar, etc.). Include all “Make From” material that is incorporated into the FAI part. For raw materials, include all materials that are incorporated into the FAI part, (e.g., weld/braze filler materials, balls for ball brazing, etc.), and Standard Catalog hardware (e.g., AN, MS fasteners); but do not include processing materials such as acid etchants.
- 7 O **Code:** Enter any required code from the Customer for material or process listing, when required.
- 8 CR **Special Process Supplier Code:** Customer given code of the organization performing special process(es) or supplying material, as applicable. Also add Special Process supplier name and address.
- 9 CR **Customer Approval Verification:** Indicate if the special process or materials source is approved by the Customer. **Write NA if Customer approval is not required.**
- 10 CR **Certificate of Conformance number:** Number of the certificate (e.g., special process completion certification, raw material test report number, Standard Catalog hardware compliance report number, traceability number).
- 11 CR **Functional Test procedure Number:** Functional Test procedure called out as Design Requirement.
- 12 CR **Acceptance Report Number:** The functional test certification indicating that test requirements have been met.
- 13 O **Comments:** As applicable.
- 14 R **Prepared By:** Name of the person who prepared this form.
- 15 R **Date:** Date when this form was completed.





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## APPENDIX F

### Instructions to complete Form QC-1353, Characteristic Accountability, Verification and Compatibility Evaluation

Note: Fields 1 – 4 are repeated on all FAIR forms. R designates Required Information, CR designates Conditionally Required information (when applicable), and O designated Optional information provided for convenience.

- |    |    |  |
|----|----|--|
| 1  | R  | <b>Part Number:</b> Number of the part (FAI part).   |
| 2  | R  | <b>Part Name:</b> Name of the part as shown on the drawing.  |
| 3  | CR | <b>Serial number:</b> Serial number of the part.   |
| 4  | O  | <b>FAI Report Number:</b> Reference number that identifies the FAI. This maybe an internal report number.  |
| 5  | R  | <b>Characteristic Number:</b> Unique assigned number for each Design Characteristic.   |
| 6  | CR | <b>Reference Location:</b> Location of the Design Characteristic (e.g., drawing zone (page number and section), specification, etc.)   |
| 7  | CR | <b>Characteristic Designator:</b> If applicable, record characteristic type (e.g., key, flight safety, critical, major, etc.).   |
| 8  | R  | <b>Requirement:</b> Specified requirement for the Design Characteristic (e.g., drawing dimensional characteristics with nominal and tolerances included, drawing notes, specification requirements, etc.   |
| 9  | R  | <b>Results:</b> List measurements(s) obtained for the Design Characteristics. <ul style="list-style-type: none"> <li>• 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 non-conforming, then that characteristic must be listed separately with the measured value noted.</li> <li>• If a Design Requirement requires verification testing, then the actual results will be recorded on the form. If a laboratory report or certificate of test is included in the FAIR, then these results need not be written on the form, record the reference numbering in this field. The laboratory report or certificate of test must show specific values for requirements and actual results.</li> <li>• For metallurgical characteristics with visual verification requirement that are rated against standard photographs, list the photo number of the closest comparison. A statement of conformance is acceptable record the reference number in this field).</li> <li>• For processes that require verification per Design Characteristic, include statement of compliance (e.g., certification of compliance, verification indicator such as “accept”, etc.).</li> <li>• For part marking, ensure that marking is legible, correct in content and size and properly located, per applicable specification.</li> </ul> |
| 10 | CR | <b>Designed Tooling:</b> If a specially designed tooling (including NC programming) is used as a media of inspection, record the tool identification number.   |
| 11 | CR | <b>Non-Conformance Number:</b> Record a non-conformance document reference number if the characteristic is found to be non-conforming.   |



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- 12 R **Prepared By:** Name of the person who prepared this form.
- 13 R **Date:** Date when this form was completed.
- 14 O This filed area is reserved for optional fields. Add additional columns as required by the organization or customer.

**6.0 REVISION HISTORY:**

| <i>REV</i> | <i>DATE</i> | <i>OWNER</i>  | <i>DESCRIPTION OF CHANGE(S)</i>   |
|------------|-------------|---------------|---|
| Ø          | 06/07/06    | C. Blanton    | New Document  |
| A          | 05/16/07    | C. Blanton    | Complete rewrite to bring in compliance with new format. No revision bars used.   |
| B          | 5/29/09     | Norman Harris | Update format, major update of content to comply with AS9102, Rev. B, added references to OP 13.1, OP 14.1, OP 16.1, OP 17.1, and OP 18.1. Rev. Bars are not used due to extend of rewrite.   |
| C          | 04/01/10    | Norman Harris | Update form, instructions and supporting verbiage to comply with AS 9102A:2004  |
| D          | 8/4/11      | Norman Harris | Update Sec. 3.30 to read “and/or supplier (where applicable)”; 3.35 Added reference to Quality Clause 59 of QP-137. 3.36 added to require FAI’s specified on a PO to be processed without benefit of Certified Supplier or Source inspection. 4.2 and 4.3 added to identify who reviews and approves in-house and supplier FAIRs. Updated 5.13 to allow approval by signature and/or stamp. Updated 5.15 FAIR approval by B-E and items to be stored by B-E and by supplier; Appendix D – eliminated typo by removing header “Appendix C and Form QC 1353” title. |