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A copy of these QA codes can now be accessed on the EFW Supplier Portal Site under General information - <http://suppliers.elbitsystems-us.com/>

REVISION HISTORY:

20 July 2009

- 1) Code 14 – Added SQE contact information
- 2) Code 15 – Rewording for clarification only
- 3) Code 23 – Added reference to ASTM-3951
- 4) Code 51 – New code – Subcontractor Parts Management Control Plan
- 5) F1 – New code – FAI/FAT
- 6) F2 – New code – IUID Marking
- 7) F3 – New Code – MIL-STD2073 – Standard Practice for Military Packaging
- 8) N1 – Added clarification for tin whisker mitigation
- 9) R2 – New code – X-ray of BGAs



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4. CERTIFICATE OF CONFORMANCE

All items must be accompanied by a C.O.C. issued by the manufacturer, certifying that all materials, processes and finished items supplied under the P.O. were inspected and found to comply with the requirements of the P.O. and the applicable specifications. Test and inspection data shall be kept on file by the seller and be available for review, on request, for a period of seven years after final delivery under the P.O., unless specified in SOW or other binding contract.

In case the seller is not the manufacturer, copy of the manufacturer's C.O.C. should be added; or, in case the seller is authorized by the manufacturer to issue a C.O.C. a copy of the authorization letter should be added. If product is coming from an independent distributor, the independent distributor's C.O.C. is acceptable.

Seller shall prepare a Certification of Conformance certifying that materials, items or services provided under this purchase order meet all applicable contractual technical and solder ability requirements called out in the applicable item specification. As a minimum, the Certificate of Conformance shall contain the following information:

- A. Material and/or item(s) identification by lot number, production date and/or Serial number.
- B. Complete technical requirements including part number(s), applicable drawing(s), specification(s), revision(s), notice(s)/amendment(s) and date(s).
- C. All Certificates of Conformance must contain the date, Purchase Order Number, Purchase order Line, signature and printed name and title of the authorized agent of the seller.
- D. Note on the C.O.C. that product complies with code 44, if applicable
- E. Material test specification and test method date of completion of testing.

For purposes of this general certification statement, computer-generated or Facsimile-reproduced signatures will be considered to have the same force as an original signature. This general Certification of Conformance shall be in addition to any specific certifications required to be delivered with the shipment by specifications or other quality documents

5. Dimensional Test Data

A copy of the seller's test report containing quantitative results of all dimensional measurements is required with each lot.

6. Functional Test Data

A copy of the seller's final test report containing quantitative results of all electrical /mechanical and/or functional tests is required with each lot.

7. Chemical & Physical Analysis

A copy of the seller's test report containing quantitative results of chemical and/or physical analysis is required with each lot. Raw material used in the fabrication of parts under this P.O. shall be traceable to a mechanical and chemical analysis. The test results shall conform to the current material specification and/or acceptance tests. A copy of the actual analysis shall accompany each delivery. The seller is also required to provide a C.O.C. which includes a statement that the parts delivered has been fabricated from certified material.

For MIL-spec paints - if test report is not obtainable, manufacturer's certs will be acceptable.



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8. Material Safety Data Sheet (MSDS)

The supplier shall attach an MSDS with every shipment, for each material.

11. First Article Inspection (FAI) according to AS9102 Requirement

Seller is responsible, prior to delivery of the first production lot, to complete an FAI in accordance with Aerospace Standard AS9102. SAE AS9102 Rev. A (or current rev) documentation can be obtained through www.sae.org <<http://www.sae.org>>. A completed copy of the AS9102 Appendix A (or current revision) forms, as well as other applicable supporting documentation, shall be presented to ESA-FW with the FAI lot. Manufacturing of the remaining lot without ESA-FW approval of the FAI is at the seller's risk. ESA-FW Supplier Quality Control (SQE) reserves the right to witness the FAI performance at the seller's facility. ESA-FW SQE shall be notified at least 10 working days prior to the scheduled FAI task. ESA-FW SQE will return written notification if we wish to witness the FAI. Exception to the AS9102 requirements will require ESA-FW Supplier Quality and/or Customer concurrence prior to product acceptance.

See Attachment 1 of Appendix Q for FAI detail instructions.

Note: CODE 11 imposed on Purchase Orders that are a follow on build that the vendor has previously performed an AS9102 FAI and has documentation on file, another FAI is only required for the following reasons:

1. If it has been 2 years or more since the vendors last build.
2. A Delta FAI to the original FAI is required, if there is a revision change on the product.

AS9102 requires an FAI whenever there is a change in facility location, or design or process that may affect fit, form or function of the part. ESA-FW Procurement and Supplier Quality shall be notified of any of these changes.

13. Customer/Customer's Third party Inspection

Customer and/or Customer's third party representative's inspection is required prior to shipment from Seller's plant. Upon receipt of this P.O. the seller shall promptly notify the customer/third party representative who normally services its plant, so that appropriate planning can be accomplished. If such representative does not serve the seller's plant, the seller shall immediately notify ESA-FW's purchasing agent.

14. Source Inspection

All work performed under this P.O. is subject to ESA-FW's inspection or test at the seller's plant prior to shipment. ESA-FW's representative may to perform inspection or test on a random basis or up to 100% inspection, including verification of certificates of conformance for materials and special processes. Unless specified otherwise on the P.O. the seller shall notify ESA-FW's Supplier Quality Control by email to SQE@elbitsystems-us.com or fax to SQE @ 817-306-6822 not less than 7 working days prior to the scheduled performance of final testing and acceptance by the seller. For deliveries subsequent to the initial delivery, the supplier shall present a copy of the AS9102 FAI report to the source inspector with each source inspection.

15. Government Source Inspection/Third Party Inspection

Government and/or Government's third party representative's inspection is required prior to shipment from seller's plant. Upon receipt of this P.O. the seller shall promptly notify the government/third party representative who normally services its plant, so that appropriate planning can be accomplished. If such representative does not serve the seller's plant, the seller shall contact the closest Air Force, Army, or Navy Inspection office. If such office cannot be located, the seller shall notify immediately ESA-FW's purchasing agent.



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16. Government Source Surveillance

The Government representative will perform process oversight of manufacturing and product management processes. Surveillance activities may be taken at such times and places, including any stage in the manufacturing process at any Subcontractor or Subcontractor's vendor's plant as may be necessary, to determine conformance to the Subcontract requirements. Such surveillance does not relieve the Subcontractor of any responsibilities under this Subcontract.

18. Raw material Identification

All raw material supplied under this P.O. must be clearly identified by the application, type, condition and manufacturer of the material.

20. Foreign Object Debris/Damage (FOD) Prevention

A. Seller shall maintain a FOD prevention program. Seller's FOD prevention program shall include the review of design and manufacturing processes to identify and eliminate foreign object entrapment areas and paths through which foreign objects can migrate. Seller shall ensure work is accomplished in a manner preventing foreign objects or material in deliverable Items. Seller shall maintain work areas and control tools, parts and materials in a manner sufficient to preclude the risk of FOD incidents. Seller shall document and investigate each FOD incident and ensure elimination of the root cause of each such incident.

Buyer shall have the right to perform inspections, verification and FOD Prevention Program audits at Seller's facility to ensure program documentation and effectiveness. Seller shall identify a FOD control person responsible for implementing FOD prevention, awareness and training.

Seller's FOD prevention program shall include Seller's periodic self-assessment of its internal FOD prevention practices, including subcontractors FOD Prevention Program at every tier, to measure effectiveness of program compliance to requirements.

Seller's FOD prevention program shall provide annual FOD training to Seller's employees. At Buyer's request, Seller shall provide records of such self-assessment and training to Buyer, upon request.

B. Seller's FOD prevention program shall, at a minimum, contain the following elements:

1. Design & Manufacturing Process Review,
2. Performance Measurement,
3. Training,
4. Material Handling and Parts Protection,
5. Housekeeping,
6. Tool Accountability,
7. Hardware Accountability,
8. Lost Items,
9. Physical Entry Control into FOD Critical Areas, and
10. FOD Focal Point(s)

C. Seller shall ensure that the requirements of this Quality Clause are flowed down to Seller's subcontractors at every tier.

D. Prior to closing inaccessible or obscured areas and compartments during assembly, Seller shall inspect for foreign objects/materials. Seller shall ensure that tooling, jigs, fixtures, and test or



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handling equipment are maintained in a state of cleanliness and repair sufficient to prevent FOD.

By delivering Items to Buyer, Seller shall be deemed to have certified to Buyer that such Items are free from any foreign materials that could result in FOD.

22. Manufacturing Date Code

Rubber Items: only items manufactured within one year prior to the date of shipment may be supplied under this P.O.

23. Packaging

Finished parts shall be adequately protected to prevent damage during handling and shipment. Parts shall be wrapped, bagged, or otherwise protected to prevent damage when packaged within a larger pack. The vendor shall be responsible for determining the method of packaging to assure protection during transit in accordance with ASTM-3951 (Standard Practice for Commercial Packaging) while taking into consideration the following specific instructions:

NOTE: **Each** package type i.e., reel, tray, bag, etc., must have the ESA-FW part number on the label.

A. Plated parts must be packaged to prevent tarnish and corrosion.

B. Leaded surface mount chip carriers (e.g. SOIC, PLCC, QFP) shall not be supplied in tubes.

C. SMT Components - surface mount plastic chip carriers shall be classified, baked, packed and labeled per J-STD-033A or its equivalent. Tape & reeled components shall be packaged in accordance with ANSI/EIA-481 or equivalent.

D. Rubber items shall be packed in bags per MIL-B-131H, Type 1, Class 2. Each bag shall be heat-sealed and marked by a label which includes the following information:

- (1) Item description
- (2) Material specification number
- (3) ESA-FW part number
- (4) Number of items
- (5) Expiration date
- (6) Manufacturing date

NOTE #1: Flat rubber items shall be packaged 5 pieces per bag, with each individual item separated from the next by a thin cardboard separator.

NOTE #2: All other rubber items shall be packaged 1 piece per bag.

E. PCB'S

- (1) Place each **individual** PCB in a protective, **anti-static** (pink) bag.
- (2) Place each **individual** bagged PCB in a low out gassing, ESD **Moisture Barrier** bag with a "NEW DRY" desiccant pack and moisture indicator card.
- (3) **Vacuum seal** each **individual** moisture barrier bag.
- (4) Label **individual** bags with part number, rev, serial number, PCB **vendor/cage code**, PCB **date code** and **date sealed**. If panelized, note useable quantity and x-out quantity per bag.

24. Electrostatic Discharge (ESD)

E.S.D. sensitive devices shall be handled, packaged and marked in accordance with the requirements of MIL-STD-1686. Tubes and rails used for packaging. Micro-electronic devices shall be made from conductive materials per MIL-HDBK-263. Connectors shall be supplied with protective caps made from conductive material per MIL-HDBK-263. ESD Labels are required to be on the outside of the box for shipment per MIL-STD-129 paragraph 5.2.20.1 and .2.



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26. Limited Shelf Life Items

Chemicals - The seller shall provide with the C.O.C., The Material Safety Data Sheet (MSDS), the expiration date, or date of manufacture, permissible shelf life, the lot or batch number, storage temperature and include any other pertinent information relating to the shelf life of the items supplied. The above shall also appear on the labels of the individual items or containers. The material shall not have exceeded 25% of the total shelf life by the date of shipment.

27. Tape & Reel SMT Devices

If the package definition on the Purchase Order is T&R, then conform to EIA taping standards EIA-481 and EIA-726 as stated below. If the package definition encoded into the Manufacturer's part number is stick or tray on the P.O., then parts are to be packaged in stick or tray as called out on the P.O.

For surface mount components smaller than 2.0 mm x 1.2 mm the requirements shall be per EIA standard EIA-726. Components larger than 2.0 mm x 1.2 mm the requirements shall be per EIA standard EIA-481. For components 25mm or larger, tray is the preferred packaging but tape and reel may be requested

28. SPC Data Requirement

A copy of the seller's statistical process control data (control charts, histograms, process capability studies), relevant to the manufacturing of this lot is required with this shipment.

31. Supplementary Q.A. Provisions (SQAP)

The seller shall meet all the supplementary quality requirements specified on the attached SQAP.

32. Statement of Work (SOW)/Corporate Work Transfer (CWT)

The seller shall meet all the supplementary quality requirements specified in the attached Statement of Work (SOW) or Corporate Work Transfer (CWT).

33. Fastener Quality Assurance Provisions

The following quality term describes the quality provisions requirements for the following:

- Bolts, nuts, screws, any press nuts or studs and washers of all kinds, 5mm or larger, requires hardening, are documented as Military (Government) or industrial standards.
- Screws, nuts, bolts or studs having internal or external threads, which bear grade identification marking required by a standard or specification.

These provisions are required according to the United States Fastener Quality Act Pub. L. 101-5982 as amended by Pub. L.104-113. The supplier shall comply with all requirements of the act, and shall identify and hold ESA-FW, Inc. harmless for any damages due to non-compliance with the act.

The approved manufacturers shall include with each shipment:

1. Test reports from a U.S. Government accredited laboratory that substantiates qualification and/or acceptance.
2. Certification of Compliance signed by an officer of the supplier, declaring that the items conform to all requirements specified in applicable standards and/or specification documents, manufacturer's identity and lot number and that an original copy of the accredited laboratory report, if applicable, is on file for inspection and review by ESA-FW, Inc.
3. Items that are individually or intermediately packaged within a container shall be marked in the exterior of each package with the manufacturer's identity, lot number and ESA-FW's PO number.



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The distributor shall include with each shipment:

- A. The approved manufacturer's certification statement, as noted in 1 and 2 above.
- B. Certification of Compliance signed by an officer of the supplier, declaring:
That a manufacturer listed as approved for the item manufactured the items.

34. As Planned/As Built Report

An As Planned/As Built report shall be submitted for each part supplied under this P.O.

35. Independent Test Lab Testing

Each lot ready for delivery under this P.O., shall be shipped to the ITL stated in the P.O. Lots approved by the ITL shall be forwarded to ESA-FW, Inc. together with the ITL test reports

36. ISO 9001 Quality System

The seller shall have a quality system meeting the requirements of ISO-9001.

37. Obsolete/Diminished Material, Broker/Independent Distributor purchases.

This code is enacted to mitigate risk associated with obsolete or diminished material and certain product purchased from jobbers/brokers or independent distributors who are **not** the manufacturer **nor** their franchised distributor.

If you have received a P.O. with this code and your organization is not the manufacture or your organization is not an approved franchised distributor for the manufacturer you must follow these steps prior to shipment;

1. Provide a picture @ 10X or better front and back for each manufacturing lot of the product you are supplying. After review of the pictures you will be notified by the buyer if you are authorized to proceed to the next step.
2. After approval of pictures provided in step 1, provide a minimum of 2 representative samples for each manufacturing lot to be shipped. A separate line item on the P.O. will be provided to ship samples against. After inspection and approval of the samples you will be notified if you are authorized to ship the full quantity on the purchase order.

Buyers shall set up the P.O. for the product to automatically be received into MRB. This is for all quantities on the P.O. with QA code 37.

38. Components Manufacturing Dates

Solderable Components

ESA-FW prefers components manufactured within the past 24 months. If components have date codes greater than 24 months, parts must be solderability tested prior to delivery to ESA-FW. The manufacturer's date code must appear on seller's packing slip, Certificate of Conformance and test data must accompany shipment to ESA-FW. Solderability tested parts should be bagged and tagged separate from remainder of lot in appropriate packaging to prevent lead damage. Solderability tested parts should accompany remainder of lot to ESA-FW.

Solderability testing for component leads is as follows:

J-STD-002 Test A, Test B or Test C as applicable and Test D. Category 3 Durability. (8 hr. Steam aging).



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Sample size per MIL-STD-1916 Attributes:

Lot Size:	Level	Sample Quantity
0-170	A	5
171-288	B	6
289-545	C	8
545-960	D	10
961 AND ABOVE	E	12

PWB's –

Seller shall supply items within three months of manufacturing date or acceptable solderability test. If the supplied items or packaging is not identified with the manufacturing/lot date, then the seller will indicate the manufacturing/lot date on the seller's packing slip. Solderability tests for Circuit Boards in compliance to:

J-STD-003 Test C solder float test (Test A--Edge Dip Test is acceptable if board has surface lands only) Category 3, Class 3, Sample size of 1 coupon or board/lot.

39. Boeing Company D1-4426 Approved Processors

Seller shall comply with the process source control requirements and limitations of Boeing Company Specification D1-4426. The most current revision of D1-4426 shall be utilized and is available at <http://active.boeing.com/doingbiz/d14426/GetAllProcessors.cfm>

40. Lockheed Martin Fort Worth Aeronautics/Missiles and Fire Control

Seller shall comply with the process source control requirements and limitations of LM Aero QCS-001. The most current revision of QCS-001 shall be utilized.

A list of Lockheed approved processors can be accessed via the Lockheed Website; <https://elli.lmtas.com/qads/QCS001Menu.asp>, if unable to access this site it is the seller's responsibility to contact the ESA-FW buyer for a list of approved special processors.

Lockheed Martin Aeronautics approved Special Processors; In accordance with Lockheed Martin Aeronautics Appendix QJ you are required to complete the 90 day usage report on behalf of ESA-FW. ESA-FW's Lockheed Martin Aeronautics supplier codes = 800765331

Seller shall comply with the requirements of Lockheed Martin Aeronautics Company Quality Clause's Appendix QX and QJ. The latest revision in effect as of the date of this P.O. is applicable. *Seller shall ensure all applicable quality requirements are imposed on sub-tier suppliers and manufacturing facilities.*

Lockheed Martin Aero Quality Clauses can be accessed at the following website:

<http://www.lockheedmartin.com/aeronautics/materialmanagement/> under the "Quality Requirements" tab.

41. Failure Analysis-

Seller shall provide a failure report indicating the failure mode, the action performed to correct the failure (including replaced or reworked part number), and the actions performed that verified the correction

42. Solder per J-STD- 001C

All electronic and electrical assemblies will be soldered per J-STD-001C or current revision. The seller shall flow this requirement to all sub-tier Contractors that perform solder processes.

43. METREG RIP 303 (P/N 12345009I ONLY)

Product must meet requirements of BMS5-72 Type IV.



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44. SPECIALTY METALS CLAUSE

The purpose of this clause is to advise ESA-FW suppliers of metal parts that it is necessary to comply with specialty metals requirements associated with DoD Contracts. The DFARS 252.225-7014 Clause, Preference for Specialty Metals, implements a portion of the Berry Amendment, a federal law (10 USC 2533a). It requires certain specialty metals (such as Steel, Titanium, Stainless Steel, or Zirconium) incorporated in articles delivered under DoD contracts be melted in the United States or a qualifying country (or incorporated in an article from a qualifying country). Qualifying countries are listed in DFARS 225.872-1. The DFARS can be found on the following website: <http://farsite.hill.af.MIL/VDFARA.HTM>. Supplier shall note on C.O.C. that product complies with this code

45. UID Label

Deliveries will require Unique Identification per DFARS 252.211-7003 and MIL STD 130 Rev L. Specific customer requirements may vary.

46. Civil Aviation Records Retention

The seller, including all of its subcontractors at all tiers, shall retain and safe guard all records related to the production of the parts for unlimited time in order to maintain airworthiness of the products. Seller shall not destroy any of the records unless Buyer written approval is provided. In the event that Seller will go out of business all records shall be provided to Buyer. Data that should be retained include but not limited to route cards, audit records, raw material C.O.C., test data, etc. Computerized records shall be backed up and kept at a safe place, protected against fire, fluids and burglary.

47. Safety Product

The material must be marked with serial and consecutive numbers, including manufacturing date. The word "SAFETY" in **red** (minimal font 28) will be marked on the external container, either by stamp or by label.

48. Lead Free Components

All components under this purchase order will be marked and identified according to IPC-1066 or J-STD-609 – "Lead or Lead free MARKING AND LABELING" standard. The C.O.C. document shall state whether the material is Lead or Lead free according to the purchase order.

49. Lithium Battery

The material will be accompanied by the following records:
MSDS containing at least: (1) Weight of Lithium in the battery; (2) UN Number; (3) Proper Shipping Name; (4) Hazard Class

50. Packaging for LCD Bare Glass

Each item shall be individually packed. Each box shall include a maximum quantity of the individually packed items. The marking of the box shall include: ESL P/N and Rev. (at least on the C.O.C.); Supplier's P/N; Date Code; LOT Number and S/N.

The packaging must be adequate to protect the entire unit (this includes LCD's glass, TAB's and electronics) from any damage, distortion or any defects during transportation, handling and storage.

51. Subcontractor Parts Management Control Plan

Supplier shall comply with requirements of document ESA-PP-0003. Contact ESA buyer for a copy of the document if not included with P.O. package. Copies are also available on the ESA Supplier Portal - <http://suppliers.elbitsystems-us.com>



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- F1** First Article Inspection / Test (FAI/T) shall be performed for all initial production items. FAI/T shall also be performed on production items that have had TDP changes made and or have been out of production 90 days or more. Written notice of any First Article Inspection, Lot Acceptance Test and/or Audit shall be provided to ESA at least 20 days prior to the event so Government or ESA can attend if desired.
- F2** The Contractor shall implement the IUID marking for those items that meet the criteria in DFARS 211.274-2. The Contractor shall provide the results of the non-recurring engineering (NRE) to the Government at no additional cost. *All delivered items with unit price \geq \$5,000; DoD serially managed; Item is mission essential Class VII major end item; A parent item contains DoD serially managed subassembly, component, or part; Additional items requiring IUID (per AR 750-1, Para 3-7.0.1) include the maintenance of all end items and Class IX repairable items with a Maintenance Repair Code (MRC) of F, H, D, or L will be managed at the serial level of detail. The Contractor shall provide a pre-delivery sample of the IUID mark to be validated prior to the first delivery.*
- F3** The Contractor shall be responsible to establish, control, and be responsible for the handling, storage, packaging, and shipping to protect the quality of the materiel and to prevent damage from loss, deterioration, degradation, or substitution of products that meets the requirements specified in MIL-STD-2073 (Standard Practice for Military Packaging) for the materiel listed in this contract.
- L1** LMMCF-816-A – Any referenced Military specifications and standards shall be to the latest revision level in effect on the date of this order
- L2** LMMCF-818 – Serialization: Any product requiring serialization must not have repeating serial numbers for the same part number, as a minimum
- L3** LMMFC-1839 - The supplier must identify any special processes used. These processes must be documented and controlled. Any certificate of compliance provided to the buyer will be considered as evidence the special processes were performed in accordance to the documented and controlled procedures. Objective evidence of this compliance must be available upon request. A special process is defined as occurring whenever a product undergoes a physical, chemical or metallurgical transformation or inspection, conformance to the specification cannot be readily verified by normal inspection methods, and the product depends on use of specific equipment operated in a specific manner, under controlled conditions, by trained personnel with instructions, procedures and standards.
- L4** LMMFC-1800 -The following may not be performed without prior customer notification and approval: Moves in production locations, either internal or external; change in design, manufacturing process, materials or other activities that affect form, fit, or function. Processes shall be documented before approval may be granted. Notification and approval request must be submitted 30 days prior to intended implementation date.
- L5** LMMFC for FAI – Copy of AS9102 form 1 must be in each box in shipment
- L6** LMMFC for CSI – Copy of customer source inspection verification must be in each box in shipment
- L7** LMMFC for GSI – Copy of Government source inspection verification must be in each box of shipment
- L8** LMMFC-1816: Unique Identification (UID) is required. In addition to installing the UID label, the following deliverables are required:
- 1) Electronic file delivered to ESA containing the UID information,
 - 2) A UID certificate of performance which must include (a) Name of contractor (b) Quantity shipped (c) PO# (d) Concatenated UID (e) UID type (f) Issuing Agency (g) Enterprise identifier (h) Original part# (i) Lot # (j) Current part# if different from original (k) Current part# effective date (l) Serial# (m)



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Statement "UID Verification marking complies with minimum print quality per MIL-STD-131 (n) UID Validation,

3) Copy of UID validation sheet.

- N1** This QA Code only applies to manufacturers of Circuit card assemblies. EFW's Tin Whisker Mitigation Plan (EFW-PP-0003, Rev. B-dated 14 June 2007) and lead Free Control Plan (EFW-PP-0002, Rev B, and dated 26 March 2007) shall be applicable to this purchase order.
- N2** Requires 12 year record retention. Applicable records are any and all documents and artifacts that prove compliance to the drawing. Records are to be delivered with the parts and should be a "stand alone" package.
- R1** Electronic, electrical, electromechanical, and mechanical piece parts and assemblies included the internal fabrication of hardware, delivered shall not have pure tin finishes. Additionally, any tin-lead (SnPb) plating or solder processes/processing shall result in a finish of no less that 3% lead composition. This applies to component leads and terminations, carriers, bodies, cages, brackets, housing, mechanical items, hardware (nuts, screws and bolts) etc. This does not apply to MIL-Spec parts or Customer drawings that allow the use of Tin (Sn) with less than 3% lead (Pb). C.o.C. shall be provided verifying the delivered product meets the above listed composition requirements.
 - a) Seller shall have contacted the original equipment mfg. to verify that the specific mfg. lot date of delivered product meets the specified minimum lead (Pb) requirement if Tin (Sn) is present in the product.
 - b) Seller has verified by actual sample testing (x-ray fluorescence testing is preferred) or other industry acceptable method that a minimum of 3% lead (Pb) is present in any process that uses tin (Sn).
 - c) Seller shall be responsible for managing the compliance with this requirement with subcontractors or sub-tier suppliers, and provide evidence of the appropriate flow-down and management of this requirement to the satisfaction of the buyer or designate. Exceptions must be authorized in writing by the buyer.
- R2** Program requires 5 year record retention. Applicable records are any and all documents and artifacts that prove compliance to the drawing.
- R3** 100% X-ray inspection of all BGA locations is required for 100% of the CCA's produced under this purchase order. X-rays are to be taken preferably using a 3D X-ray. X-ray must be taken at an appropriate angle to clearly show the existence of solder balls or acceptable solder coverage under the BGA.

These X-rays must be captured on a CD and included with the product shipment.

Each X-ray must be labeled with the PN, SN and BGA ref designator.

These records must be retained by the supplier for a period of 7 years past the contract date.

Attachment 1 Appendix Q

ESA-FW VENDOR FIRST ARTICLE INSTRUCTIONS

When performing First Article Inspection (FAI) the instructions in Attachment 1 of Appendix Q details the specific methods and expectations of the vendor for verification of the vendor's assembly and set up processes and to verify that product conforms to the drawing, Bill Of Material (BOM) or part list requirements.

Acronyms /Definitions:

BOM – Bill of Material
CK/SUM - Check Sum
DEV - Deviation
ECO- Engineering Change Order
ECP - Engineering Change Proposal
ESS - Environmental Stress Screening
FAI – First Article Inspection
ICT - In Circuit Test
PL – Parts List
PWA – Printed Wiring Assembly
PWB – Printed Wiring Board
REV- Revision
S/W VER - Software Version
SMT - Surface Mount Technology
TH - Through Hole Technology

1.0 PWA GENERAL FAI REQUIRMENTS:

ESA-FW requires evidence that the vendor has configuration control for non-deliverable software and has verified that the files such as SMT pick and place, Contact systems, (AOI) – Automated Optical Inspection systems or similar equipment electronic media files are to the current Revision of the Bill Of Material (BOM) and Reference Designator Listing (RDL) if applicable. A printed copy shall be provided as objective evidence with the FAI documentation and shall have the signature of the vendor's Quality or Engineering representative that the data is correct. A work printout check sheet should be used or provided such as a Word or Excel spread sheet for ease in verification and identification of the correct quantity of components, part numbers and reference designators to aid inspection verification of the BOM and vendors AS9102 documentation.

ESA-FW Supplier Quality engineering shall be notified a minimum of 1 week in advance of the First Article productions run so that arrangements can be made for the ESA-FW representative to participate in the initial FAI set up processes, verification of soldering (manual and automated), Programming, In Circuit Testing (ICT) processes prior to coating and Final Acceptance Testing.

First Article Inspections (FAI) may be performed on a minimum of 3 PWA from the first lot produced by Product part number or as per the ESA-FW Program SOW issued to the vendor on the Purchase Order or per the drawing and BOM requirements.

Unless otherwise directed in writing, the Subcontractor shall be at their risk to produce additional products until ESA-FW has accepted the FAI.

Attachment 1 Appendix Q
ESA-FW VENDOR FIRST ARTICLE INSTRUCTIONS

1.1 PWA PROCESS VALIDATION / VERIFICATION:

First Article Process documentation requirements apply to the Vendors manual Through Hole (TH) component insertion by hand assembly or Semi-automated processes such as Contact Systems and automated Surface Mount Technology (SMT) assembly for verification of component placement by part number and reference designator. The vendor should provide documentation showing Objective Evidence that the process is repeatable and that the vendor has performed verification of the process. Production files or Work Instructions should give instructions for manual processes for component installations and hand soldering. Computer software or vendor non-deliverable files used in the set up & assembly process shall be configuration controlled. A copy or print out of the component set up or Pick and Place file used in the automated SMT assembly process shall be provided for used by the ESA-FW Source Representative for verification of component placement Reference Designators part numbers with the current revision BOM / PL. This documentation shall be become part of the First Article Documentation as objective evidence.

1.2 PWA (TH) THROUGH HOLE & HAND COMPONENT INSERTION PROCESSES

For assemblies with TH components using automated process such as a contact system the vendor shall provide a copy of the machine set up for SI verification of the component Reference Designators and part numbers with the current Revision of the Bill of Material (BOM). This form is used to document the verification of the supplier documentation requirements for either in-process activities or final acceptance of the PWA assembly set up process. For manual hand or add-on components and soldering process should be identified in Production Files or Work Instructions showing documented process for repeatability.

1.3 PWA SMT – SURFACE MOUNT TECHNOLOGY / AOI – AUTOMATED OPTICAL INSPECTION

The Vendor is responsible for and shall verify that the Ref Designators listed and component part numbers in the SMT Pick and Place file or AOI matches the current BOM Revision. Objective evidence is required as part of the FAI documentation package. This shall consist of a print out of the vendor pick and place file or AOI program that has been checked against the ESA-FW BOM for component part number correctness. This shall have the signature of the Process engineer or Quality representative stating all components have been verified to the current BOM revision including writing the revision number that was verified. The Reference Designator Listing (RL) shall also be used when the BOM does not list all the reference designators. This shall be verified and checked for agreement to the BOM part numbers and quantities. Note: The BOM takes precedence over the RL if there is a conflict of part numbers and ESA-FW shall be notified immediately for clarification and corrections as needed.

During First Article Set up of the SMT feeders reel locations the Part number shall be verified to be in agreement with the current BOM and documentation shall be provided listing the feeder locations for each of the part numbers. Note: Vendors using automated SMT equipment such as a” My Data” utilizing “Smart Reels” the SMT reel placement may vary during other production runs.

The copies of objective evidence shall become part of the FAI documentation. A copy of the FAI documentation shall be included with first product produced and shipped to ESA-FW. If desired the FAI documentation package can be shipped to ESA-FW Supplier Quality Engineering attention for

Attachment 1 Appendix Q
ESA-FW VENDOR FIRST ARTICLE INSTRUCTIONS

retention and FAI program FAI completion. ESA-FW Supplier Quality should be contacted so they are aware that the documentation is being shipped separately.

2.0 FAI Mechanical – Castings, Machined Chassis & Machined Parts:

All dimensions of the drawing must be reported ***including*** the dimensions derived from any attached media, i.e., SAT files **that have been verified** by the vendor.

A Copy of the annotated drawing and any vendor generated drawings/sketches used to identify dimension locations referenced on the dimensional report must be included in the FAI package. It is preferred that dimensions derived from attached media, i.e. SAT files be reported on Form 3, and recorded in the same unit of measure denoted on the drawing (inches or mm) and are clearly marked as SAT dimensions.

The following will be required and must be submitted for all FAI's:

1. Form 1: Part Number Accountability
2. Form 2: Product Accountability
3. Form 3: Characteristic Accountability and any dimensional attachment used to record dimensions derived from the SAT file.
4. Objective evidence of material certifications and special process certifications
5. Copy of the annotated drawing, including any vendor generated drawing/sketches
6. Certificate of Conformance
7. Source Inspection Report



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**For Reference only - See Baan
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Revision History: 21 July 2009

1) Para 6.1 and 6.2 Reissued to change requirement for record retention to 7 years.



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1.0 GENERAL REQUIREMENTS

- 1.1 Seller shall notify buyer of any adverse changes in quality system status resulting in the loss of 3rd Party registrar's certification within 30 days.
- 1.2 The Seller shall provide for review of the EFW, Inc. purchase order to assure that all contractual requirements are included in manufacturing planning, inspection, test instructions, as applicable, and all items procured from it's supplier's are in compliance with the PO requirements
 - 1.2.1. Seller shall notify Buyer, in writing, when any Key Characteristic (KC) interchangeable-replaceable features, fracture critical features, durability critical features, maintenance critical features, safety critical features, mission abort critical features or changes affecting fit, form, function or spares are to be subcontracted.
 - 1.2.2. Seller shall have procedures for determining the capability of their sub-tier prior to issuing a PO to sub-tier.
- 1.3 Seller shall establish controls to ensure that material subject to age control shelf life, or environmental controls are properly identified, monitored and maintained.
- 1.4 Seller shall maintain a documented calibration system for the calibration and maintenance of tools, jigs, inspection and test equipment. Seller's calibration system shall be compliant to prevailing industry requirements in accordance with Seller's Quality Management System to include ISO-17025, ISO10012:2003 or ANSI Z540.
- 1.5 Seller shall provide for the safety and convenience of Buyer and/or Buyer's customer, access and assistance, without additional cost, to any and all areas, where work is being or is scheduled to be performed under this Purchase Order. Buyer and or Buyer's customer may perform in-process inspection, product audits, and system surveillance at Seller's facilities as part of verification of conformance to contract. Access denial could result in inactivation of Seller's approval.
- 1.6 Work under this PO is subject to Buyer's periodic audit of Seller's compliance with Seller's internal procedures and other documents applicable to this PO.



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1.7 Seller shall provide, at no increase in price, cost or fee to Buyer, Government or appropriate regulatory agencies, suitable facilities at Seller and Seller's subcontractors' manufacturing locations for Buyer, Government and regulatory agency representatives to perform compliance verification.

1.8 Seller is responsible, prior to delivery of the first production lot, to complete an FAI in accordance with Aerospace Standard AS9102. A completed copy of the AS9102 forms, as well as other applicable supporting documentation, shall be presented to ESA-FW with the FAI lot. See QA Code 11 for complete details.

Seller shall notify EFW Procurement and Supplier Quality of any changes in facility location, or design or process that may affect fit, form or function of the part, at which time a new First Article is required. Seller's First Article Inspection process shall be in compliance with AS9102.

1.9 Seller shall be aware that It is illegal, under United States law, to knowingly market or sell counterfeit goods utilizing the logo, trademark, trade dress or other distinctive features of another's products or services that confuse the public regarding the true nature or origin of the product or service. Buyer will not submit payment for Counterfeit material and such material will be destroyed by Buyer.

1.10 All components and finishes shall be as indicated on the EFW supplied drawing and parts list. EFW may have customer restrictions as to allowable surface finishes. No unapproved substitutions may be made. If conflicts are apparent or the indicated source of supply is not available, seller shall contact EFW for clarification or approval. Lead free soldered designs must be fully qualified prior to production use.

2.0 BUYER FURNISHED MATERIAL

2.1 With each delivery containing Buyer furnished material, Seller shall certify as part of the statement of quality as follows:

"The material used on this order includes material furnished by Buyer and no unauthorized substitutions have been made."

2.2 When repairing property furnished by the Buyer, the seller will use only new materials unless written permission is provided by the Buyer.



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- 2.3 If the seller receives part specific written permission from the Buyer to use used or reconditioned materials, then the Seller will maintain configuration management records in accordance with AS9100 and guidance from ISO10007.
- 2.4 If the seller receives direction from the buyer to scrap Buyer property, then the Seller will prepare a Scrap Certificate of assemblies scrapped including:
- (a) Part number(s),
 - (b) Serial number(s), and
 - (c) Part numbers, nomenclature and serial numbers of any subassemblies or parts missing from scrapped assemblies. Seller shall not "salvage" any parts from items to be scrapped without part specific written permission from the Buyer.
 - (d) The Seller's designated representative's printed name and signature
 - (e) Scrap Certificate Date

3.0 BUYER AT SOURCE REQUIREMENTS

- 3.1 When Buyer Source Inspection is specified in this Purchase Order, Seller shall comply with the following:
- (a) All work performed under this PO is subject to EFW's inspection and test at the supplier's facility prior to shipment. EFW's representative may elect either to perform inspection or test on a random basis or up to 100% inspection. Seller shall present with each shipment, for review by the Buyer representative, the final inspection/test results, as applicable, and the required certifications.
 - (b) When modifications, repairs or replacements occur after Seller's final inspection or testing, Seller's Quality Assurance shall perform re-inspection and retest of affected characteristics prior to presentation for Buyer inspection.
 - (c) Seller shall obtain evidence of Buyer's Field Representative's acceptance, prior to shipment (signature OR stamp) on EFW's Source Inspection Report.
 - (d) Seller shall include a copy of the Source Inspection Report with each shipment of accepted materials.
 - (e) Seller shall provide a Certification of Conformance (COC), or Statement of Quality (SOQ) to attest that all supplies presented meet the applicable purchase order terms and conditions. This certification shall bear the signature of an authorized agent of the Seller.



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- (i) For purposes of this general statement of quality, computer-generated or facsimile-reproduced signatures will be considered to have the same force as an original signature.
- (ii) This general statement of quality shall be in addition to any specific certifications required to be delivered with the shipment by specifications or other quality documents. All statements of quality shall accompany the shipment.

4.0 MATERIAL REVIEW AUTHORITY

- 4.1 MATERIAL REVIEW AUTHORITY (MRA) - Seller does not have MRB authority, but is allowed to rework an item to drawing or to scrap it. Any "repair" or "Use-as-is" dispositions are to be approved by buyer MRB.

5.0 BUYER-FURNISHED, SELLER-MANUFACTURED OR SELLER-OWNED TOOLING

- 5.1 Seller's documented quality system shall include written procedures for the control, maintenance and calibration of special tooling, jigs, inspection and test equipment, and other devices used in manufacturing processes.

6.0 CHANGES TO SELLER'S OPERATIONS

- 6.1 Seller shall maintain complete records of all manufacturing, inspection and testing in connection with the Items. At Buyer's election, and at no additional price, cost or fee, Seller shall provide such records to the Buyer, Buyer's Customers and/or appropriate regulatory agencies during the performance of this PO and for at least **seven (7)** years after completion of this PO or for such longer periods, if any, as may be specified elsewhere in this PO. Upon Buyer's request therefore, Seller shall forward such record to Buyer at no price, cost or fee to Buyer.
- 6.2 Records of manufacturing, inspection, and test (Objective Quality Evidence) shall be maintained and stored by Seller for a period of **seven (7)** years after completion or termination of this Purchase Order. The COC's, SOQ's final inspection/test results, and all objective evidence which substantiates Seller's certifications, including certification for buyer furnished material, shall be retained on file at Seller's facility, When additional quality requirements so specify, appropriate data shall be provided with each shipment. This data shall be readily available for subsequent on-site review by Buyer. When requested by



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Buyer, Seller shall provide at no cost, legible photocopies of inspection/test results or substantiating objective evidence for any certification or statements of quality.

- 6.3 Seller shall maintain documented records of tool control whether the tooling is furnished by Buyer, or manufactured by Seller and/or Sellers' sub-tier, or is Seller-owned.

The requirements imposed by this Quality Appendix are denoted as "QG" on the Purchase Order and may be supplemented by one or more additional appendices denoted as "QUALITY CLAUSES". For example, the entry "QG, 8, 11" appearing in the Purchase Order shall mean that Quality Clause 8 and Quality Clause 11 are also imposed on the Purchase Order.