

QUALITY ASSURANCE PROVISIONS

GENERAL REQUIREMENTS:

Unless otherwise specified in the purchase order, the following general requirements apply to this purchase order.

Access to Facilities: The Buyer reserves the right to authorize Buyer and Buyer's Customer's and regulatory authorities to the applicable areas of all facilities, at any level of the supply chain, involved in the order and to all applicable records.

Conflicts: In the event of conflicts between the requirements of this document and applicable detail specifications or drawings, the latter documents shall govern.

Documentation: The Buyer may refuse to accept items delivered under the purchase order if the Seller fails to submit the certification, documentation, test data or reports specified in the purchase order. Documentation includes Buyer's source inspection record when source inspection is performed.

Unauthorized Repairs: Unless authorized by the Buyer, Seller will not repair by welding, brazing, plugging, soldering or adhesives, parts damaged or found to be faulty during fabrication

QUALITY ASSURANCE NOTES:

Astronics Test Systems ACCEPTANCE AT DESTINATION

1. Articles ordered in this contract are subject to final acceptance at destination.
 - a) Articles ordered are subject to final acceptance at destination per ORL.QUA.310.15.

GOVERNMENT SOURCE INSPECTION

2. Government inspection is required prior to shipment from your plant. Upon receipt of this order, promptly notify the Government Representative who normally services your facility so that appropriate planning for Government inspection can be accomplished.
3. All work on this order is subject to inspection and/or test by the Government (FAA/DCMA) Representative. The Government Representative shall be notified a minimum of 72 hours in advance of the time articles or materials are ready for inspection or test. The Government reserves the right to inspect any or all of the work included in this order at the Seller(s) facility.

4. SOURCE INSPECTION

All work performed under this purchase order is subject to Astronics Test Systems Inc. Source Inspection at the Seller's facility. Astronics Test Systems Inc. representative may select to witness inspection/testing either on a random basis or up to 100%. Unless specified otherwise on the purchase order the Seller shall notify Astronics Test Systems Inc. Quality Assurance Department not less than 7 working days prior to the scheduled performance of final testing and acceptance by the Seller. Times of these visits will be arranged so as to be mutually agreeable between Buyer and the Seller(s).

- Buyer representative and Buyer customers, when accompanied by Buyer representatives shall be granted access to the Seller(s) facility to review or monitor the Quality/Inspection system including In-process controls and final acceptance.
- Release of material by Buyer Quality Representative is required prior to shipment from Seller's facility. Release of material from Seller's facility does not constitute final acceptance. Final approval and acceptance will occur by Buyer Quality Assurance at the destination.
- Mandatory In-Process ("MIP") inspection of material by Buyer Quality Representative may be required during specific parts of the process, as defined in attached contractual or related documents, at your plant. Notify the Buyer Quality Office at least 7 days in advance on any assembly which cannot be inspected as a result of further processing. (Pre-cap inspection is a prime example of an in-process inspection point.

QUALITY CONTROL SYSTEM REQUIREMENTS

- 5 Suppliers providing material or services not under the AS9100 classification shall maintain a quality system that is compliant to

ISO9001/2015 or equivalent and shall be verifiable by Astronics Test Systems.

- 6 The supplier's system of quality control during the performance of this contract shall be in accordance with the latest Aerospace Standard SAE AS9100 or applicable statutory and regulatory quality management system requirements
7. **SUB-TIER SUPPLIER CONTROLS:** supplier who subcontract work to their suppliers must flow-down all applicable quality requirements noted on the drawing, purchase order and this document.
8. **CALIBRATION:** The supplier's system of test equipment repair and calibration shall be in accordance with;
 - a) ANSI/NCSL Z540, Calibration System Requirements. Seller shall furnish with each shipment a Certificate of Calibration
 - b) ANSI/ISO/IEC 17025 "Calibration System Requirements". Seller shall furnish with each shipment a Certificate of Calibration. Certificates of Calibration with traceability to NIST or equivalent international standard body are to be provided with each unit.

CERTIFICATION/DECLARATION OF CONFORMITY

9. Items on this purchase order must be accompanied by Certificate of Conformance (C. of C.) issued by the Seller certifying that all material, processes and finished items supplied were inspected and found to comply with the requirements of the purchase order and the applicable specifications. The certificate shall bear as a minimum the following information and the Test and inspection data shall be kept on file by the Seller and be available for review upon request:
 - a) Seller's name and address
 - b) Date certification issued
 - c) Buyer's purchase order number
 - d) Governing specification
 - e) Signature and title of a company authorized representative of management (**Mandatory**)
 - f) Certification of "Special Processes" either as part of the body of the Certificate of Compliance being submitted or as an attachment thereto.
 - g) Part Number and Part Nomenclature
 - h) Country of Origin (**Mandatory**)
- 10 The condition of this order is that the seller shall have records available to substantiate the compliance of this material with reference specifications and will furnish copies of these records upon buyer request.

11. LIMITED SHELF LIFE ITEMS:

For materials/products that performance is affected by shelf life and/or environmental storage conditions, each part level package shall be marked with the date of manufacture or the useful life

expiration date of the Contents. When marking is impractical a certificate with this information shall be included with the shipment. If environmental control increases/decreases shelf life, identify material and paperwork with recommended storage environment. Do not ship material with less than 80% useful shelf life..

RAW MATERIAL TEST DATA

12. The supplier shall submit, with each shipment, a Certified Test Report (CTR) indicating conformance to requirements of the applicable drawings/specifications. Each CTR shall contain the following minimum requirements
- ◆ Name and address of material supplier
 - ◆ Contract #
 - ◆ Identification of material by specification, revision, amendment, and dates, together with size, grade, type, etc.
 - ◆ Quantity of material
 - ◆ Test results identified by reference to the applicable requirements
 - ◆ Date, signature, and title of supplier representative that is attesting to the accuracy of the test report (In the case of certain electronically produced documents, signature requirement may be waived, in writing, by the Buyer representative)
- a) The CTR is to be traceable to the material used to produce each shipment against this contract . Supplier shall provide a copy of all raw material certifications, special processing records and certifications as recorded during the performance of this procurement order.

PACKING/PACKAGING

13. Product(s) supplied by this order shall be adequately packaged/packed to prevent damage and contamination of parts and their markings.
- a) Commercial packing is normally acceptable for shipment to Buyer. Seller is responsible for selecting packaging methods and materials, which provide adequate protection at minimum cost. Packaging methods and materials selected should consider, as a minimum, fragility, part composition, surface finish, size, and weight and transportation mode.
 - b) Each contract item must be packaged and identified separately. Markings on primary packaging must include the part number, nomenclature and quantity. If applicable, include serial number, lot number and cure date.
 - c) DO NOT combine items from different Purchase Orders in the same shipping container.
 - d) The following items are prohibited: staples used for closing bagged parts; loose fill packaging material, (i.e., plastic peanuts), unless contained in a polyethylene bag or similar method.
 - e) Seller must provide legible packing slips in a conspicuous and easily accessible place on the shipping container, unitized or palletized load. The packing slip must state the Order number, Order item number and Part number as shown on this contract.
 - f) When applicable, the packing slip must also include the appropriate control numbers, (i.e., serial, lot batch, roll, heat lot, heat treatment, etc.) and cure/manufacturing date. All associated paperwork, (i.e. certifications, test reports, MSDS etc.) must be located with the packing slip.
 - g) Bar Coded labels are to be affixed to each item and to include the following information: Order number, Line item, Part number, Unit of Measure, Quantity, and when applicable, Date code and Serial number.
 - h) Seller's shipping document accompanying each shipment of reworked or replacement article(s) must bear adequate reference to the buyer's rejection document, and objective evidence that the cause(s) for rejections have been corrected.
 - i) Seller shall mark all hardware (i.e. circuit assemblies, subassemblies, assemblies...etc.) used in the purchased hardware containing ESD sensitive components with either the military complaint symbol defined in MIL-STD-1686 or the EIA625 standard.

- j) Items on this purchase order require special ESD handling and ESD protective packaging. The Seller shall assure ESD safe handling procedures during repackaging these items. Seller shall utilize industry standard techniques on all relevant processes, operation and inspection areas handling ESD sensitive components, including static sensitive packaging. Systems shall be adequate to protect the most sensitive components in use.

DOCUMENTATION FAILURE ANALYSIS REPORT / FUNCTIONAL TEST DATA

14. The Seller(s) shall analyze returned parts/assemblies that fail. This analysis shall be of sufficient detail to pinpoint the exact failure mode and mechanism. Results of the analysis shall be documented either on the supplied Supplier Repair Report or on a Buyer (s) form, referencing the Return Material Number, or returned with the repaired assemblies and provide objective evidence that the cause(s) for rejections have been corrected.
15. Supplier shall provide a complete Inspection Report as recorded during acceptance for purpose of quality analysis.
16. The supplier shall obtain approval through Astronics Test Systems buyer prior to any material, design, tooling, or processing change that may affect function, interchangeability, or reliability. This shall apply to both Astronics Test Systems design and supplier proprietary items
- Substitution parts shall not be used for parts specified in the Order.
 - Seller proposed changes in design, fabrication methods or processes on Buyer or customer-designed articles (other than commercial or off-the-shelf items) shall have prior documented approval of the Buyer Procurement Representative. Such approval does not waive applicable inspection and/or acceptance requirements.
17. Supplier shall provide two (2) copies of each acceptance test procedure for approval prior to conducting tests
18. Supplier shall provide a complete set of test data certified by an authorized representative of management as recorded during the performance of this procurement order and as specified below for the purposes of quality analysis.
- a) Acceptance test data
 - b) Qualification test data (this data may be based on previous qualification data on a similar part type)
 - c) Screening test data - test results for each lot or batch of material shipped.
19. **WORKMANSHIP:** Workmanship shall conform to MIL-HDBK-454 "Standard General Requirement for Electronic Equipment" and/or IPC-A-610 Class 2 "Acceptability of Electronic Assemblies" (latest revision release) unless otherwise noted on Assembly Documents and/or Statement of Work.
20. **ACCEPTANCE BY USER (Internal Use Only).** Material ordered under this note is for maintenance or for evaluation and will be accepted by the user to his requirements. This material is not intended for delivery to Astronics Test Systems customers.
21. **FIRST ARTICLE INSPECTION & REPORT:** Supplier of Astronics Test Systems designed parts, assemblies, and forging/ foundry supplied castings shall furnish.
- a) A first piece inspection report is required with the first lot supplied under this purchase order. The inspection shall be performed and documented by the Seller and shall have 100% of all attributes inspected. The piece used for this inspection shall be labeled and clearly identified.
 - b) A first article inspection is required prior to start of the production run to demonstrate compliance with the requirements of the purchase and referenced specifications. The first article shall be identified as the first article part including the part number and purchase order number. Submit the first article to Buyer's receiving inspection for test and/or

inspection. Include Seller's first article inspection data, indicating actual values measured for each characteristic.

- c) First Article Inspection using FORM AS9102 is to be required to provide objective evidence that all engineering design and specification requirements are properly understood, accounted for, verified, and documented
- d) Delta first article inspection report per AS9102 shall be provided when delivering new purchased item revision. If a change is made to the product affecting form, fit or function of the end item.

22. APPROVED SPECIAL PROCESS:

- a) This order contains requirements for special processes which can only be performed by Boeing approved special processors and manufacturers as required and listed in document D1-4426 "Boeing Approved Process Sources"
- b) This order contains requirements for special processes which can only be performed by Lockheed approved special processors. Lockheed approved special processors may be found on the Quality tab, under Current Approvals in Exostar if you access or contact your Buyer

23. MATERIAL SAFETY DATA SHEETS (MSDS): One (1) copy of the MSDS shall accompany each shipment for all chemicals as required by 29 CFR 1910.1200.

24. SERIALIZATION: Each item furnished on this purchase order shall be identified by a unique serial number. When specific serial numbers are required, they shall be identified by the Buyer on the purchase order.

QUALITY RECORDS

25. The condition of this order is that the Seller shall Maintain on file Quality documentation records, raw material certifications, inspection, special processing records and certifications. Such records shall be available to the buyer, on request for a period of not less than seven (7) years from the closing of the Purchase Order. After this time period, Seller shall not destroy such records without giving Astronics Test Systems ninety days advance written notice

SUPPLIER'S SOFTWARE QUALITY ASSURANCE SYSTEM

26. Supplier shall develop and maintain a software quality assurance system that complies, as a minimum requirement, with the standard(s) designated by Astronics Test Systems Inc. and/or as specified by Customer/Government Flow down requirements. Supplier's system shall be subject to audit by the Buyer's Software Quality Assurance (SQA) Representative. Waiver to quality requirements is not valid unless obtained in writing from Buyer

SOFTWARE QUALITY PROGRAM PLAN (SQPP)

27. Supplier shall plan, develop, publish and implement a SOPP, which addresses all software quality requirements as set forth in the prime contract. The SOPP shall be used by Supplier to evaluate the quality of the software and associated documentation, and software development activities. This document shall be reviewed and approved by Buyer's SQA Representative.

SOFTWARE DEVELOPMENT PLAN (SDP)

28. Upon contract award, Supplier shall plan, develop, publish and implement a Software Development Plan (SDP). The SDP shall provide a description of Supplier's plans for conducting the activities of the software development process in accordance with CMMI Level 3 and the Purchase Order. When CMMI Level 3 is not invoked the SDP shall include the items listed below and in either case shall be subject to review, audit and approval by Buyer's SQA Representative.

- a) Identification of the resources and organization required to perform software development.
- b) Plans for the management of Supplier's software development effort, including identification of the software development schedules and milestones.

- c) Plans for performing software configuration management, including the procedures for controlling the software and its associated documentation utilizing a Software Development library (SDL).
- d) The standards, procedures, methods and tools to be used in the Supplier's software development effort.
- e) Plans for formal software testing.
- f) Plans for software product evaluation.

SOFTWARE DEVELOPMENT FILES (SDFs)

29. Supplier shall document the development of each Computer Software Unit (CSU), Computer Software Component (CSC), and Computer Software Configuration Item (CSCI) in Software Development Files (SDFs). Each SDF shall contain information pertinent to managing and statusing the software development effort. The SDF should contain at least the following sections/information:

- a) File identification
- b) Development Schedule
- c) Development Status
- d) Allocated Requirements
- e) Design Material
- f) Source Code
- g) Test Information (cases, procedures, results)
- h) Review Comments

SDFs shall be subject to review and audit by Buyer's SQA Representative.

SOFTWARE DEVELOPMENT LIBRARY (SDL)

30. Supplier shall establish and maintain written procedures for control and handling of source and object code, identification and documentation of different versions of software, tools and documentation, and placement of all these development products under configuration management control. These procedures are subject to audit/review by Buyer.

REVIEW AND CONTROL BOARDS

31. Supplier shall notify Buyer of nonconforming process, products, or services and obtain approval for their disposition.

AUTOMATED TEST EQUIPMENT (ATE) SOFTWARE CONTROL

32. Supplier shall control all ATE software utilizing Data Control indicators (e.g. Revision control, Library control and listing).

PERIODIC AUDIT OF SUPPLIERS

- a) Suppliers providing Astronics Test Systems critical components shall be subjected to periodic audits on a yearly basis, not to exceed 18 months
- b) Suppliers whose performance falls below acceptable levels may be audited on a more frequent basis until the quality performance levels are improved.
- c) Supplier's maintaining a system of quality control in accordance with the latest Aerospace Standard SAE AS9100 or ISO 9000 during the performance of his contract shall provide a copy of their current certification only.

34. SPECIAL PART HANDLING: Parts are to be used for precision components and require cleanliness protection and care in handling from excessive bulk handling, excessive bulk packaging, dropping from automated machinery, and tumbling, which can cause "dings and dents" damage to the material surface.

35. NONCONFORMING MATERIAL: Seller(s) wishing to apply for authority to make disposition of Nonconforming material should forward their requests together with their procedures to Buyer. Formal approval of these procedures and written permission to implement Material Review must be received from Buyer.

COUNTERFEIT PARTS AVOIDANCE PROGRAM:

- a) Seller shall have an established counterfeit parts avoidance program to prevent counterfeit components from being shipped to buyer's facilities. . The documented processes shall assure that all occurrences of counterfeit parts are reported, as appropriate and applicable, to internal organizations, customers, government reporting organizations (e.g., GIDEP), industry supported reporting programs and criminal investigative authorities.
- b) Full traceability of procured parts is required to be furnished in order to detect potential counterfeit parts. Paperwork should be complete and show full compliance to the specification and traceability to the OCM or OEM.

SPECIAL PROCESS CERTIFICATE:

- 37. The supplier shall provide one (1) legible and reproducible copy of a certificate for each special process performed per the Astronics Test Systems purchase order. Special processes include but are not limited to such processes as heat treat, soldering, cleaning, x-ray, plating, painting, welding, brazing, anodic or cathodic coatings and non destructive test inspection. The certificate shall include Astronics Test Systems's purchase order number, special process description with any applicable classification, type, grade, thickness, time, temperature or any other applicable requirement noted on the purchase order or specification. The certificate shall bare the signature and title of an authorized representative from the supplier.

INTERNATIONAL TRAFFIC and ARMS REGULATIONS ITAR:

(http://pmdtdc.state.gov/regulations_laws/itar_official.html)

- 38. The supplier certifies to inform those employees having access to ITAR controlled documents and technical data, including support documentation of the following:
 - a) The supplier understands the requirements of ITAR and certifies it will not disseminate any ITAR controlled documents, technical information which would violate applicable export control laws and regulations.
 - b) Supplier understands that ITAR restricts any Foreign National from having access to posses, view, copy or remove ITAR related documents from the subcontractor's control.
 - c) Supplier shall not assign any Foreign National to work directly on ITAR sensitive information.
 - d) Where the supplier provides prints, technical data or documents falling into the description of ITAR controlled items to it's subcontractors including e-mails, it will mark such documents with the following or equivalent statement:
 "This document contains technical data that is controlled by ITAR. Access to this document is restricted to U.S. citizens and lawful permanent residents (US "green card "holders). By accepting this data the consignee agrees to abide by the requirements of ITAR."

39. RoHS Compliance Required

The product stated on this purchase order must comply with the Directive 2011/65/EU of the European Parliament and of the Council of 8 June 2011, as amended by Commission Delegated Directive (EU) 2015/863 (RoHS 3). A Certificate of Compliance of declaration of conformance to this directive must accompany the shipment stating the parts comply with RoHS2 and any pertinent information that will provide the ability to segregate our inventory and assure compliance

40. Product Impoundment and Financial Responsibility

"If counterfeit parts are furnished under this purchase agreement, such items shall be impounded. The seller shall promptly replace such items with items acceptable to the Astronics Test Systems Buyer and the seller maybe liable for all costs relating to impoundment, removal, and replacement.

- 41. SELLER represents and warrants that only new and authentic materials are used in products required to be delivered to Astronics Test Systems and that the hardware delivered contains no counterfeit Parts. No material, part, or component other than a new and authentic part is to be used unless approved in advance in writing by Astronics Test Systems

- 42. SELLER shall flow the applicable requirements (i.e. Counterfeit parts prevention, customer requirements..etc.) to its subcontractors and suppliers at any tier for the performance of this Contract.

43. CONFLICTS MINERALS

- a) Seller is expected to ensure that any product delivered to Buyer under this order are Democratic Republic of the Congo (DRC) conflict free (do not contain metals derived from "conflict minerals" (as such term is defined below) such that they directly or indirectly finance or benefit armed groups through mining or mineral trading in the DRC or an adjoining country (Angola, Burundi, Central African Republic, The Republic of the Congo, Rwanda, South Sudan, Tanzania, Uganda, Zambia). Seller is to establish policies, due diligence frameworks and management systems, consistent with the Organization of Economic Cooperation and Development (OECD) Due Diligence Guidance for Responsible Supply Chains of Minerals from Conflict-Affected and High Risk Areas (copy available through OECD.org web site - search for "conflict minerals"), that are designed to accomplish this goal.
- b) Seller shall disclose any "conflict minerals" (as such term is defined below) used in the production of any product delivered to Buyer by Seller under this order, and, in the event such materials are used, shall submit, as applicable, either (i) its report filed with the Security and Exchange Commission under Section 1502 of the Dodd-Frank Wall Street Reform and Consumer Protection act, or (ii) a description reasonably acceptable to Buyer of measures taken to assure the appropriate sourcing and chain of custody of such materials.
- c) As used above, the term "conflict minerals" shall have the meaning ascribed to it under Dodd-Frank and shall include, without limitation, columbite-tantalite (coltan), cassiterite, gold, wolframite or their derivatives (including but not limited to, tin, tantalum and tungsten), or any other mineral or its derivatives determined by the US Secretary of State to be financing conflict in the DRC.

44. MERCURY CONTAMINATION

Functional Mercury and Mercury contamination prohibited notwithstanding any other provisions of order, material furnished by seller shall not contain functional Mercury unless specific written approval has been obtained from Buyer.

45. PCBs

- a) Printed Circuit Board Acceptability shall be per IPC-A-600 class 2 unless otherwise specified on the product documentation.
- b) 100% Test Printed Circuit Boards as follows:
 - i) 10 ohm Maximum Continuity Resistance
 - ii) 1 megohm Maximum Resistance.

46. COPY EXACTLY BASELINE

Functional Mercury and Mercury contamination prohibited notwithstanding any other provisions of order, material furnished by seller shall not contain functional Mercury unless specific written approval has been obtained from

47. CONFORM TO COPY EACTLY

Functional Mercury and Mercury contamination prohibited notwithstanding any other provisions of order, material furnished by seller shall not contain functional Mercury unless specific written approval has been obtained from

- 48. A Subcontractor Management Plan (SMP) may be established with subcontractors where deemed necessary by Buyer to assure compliance to specific programs and/or contracts. The requirements imposed by this document shall stay in effect along with any additional requirements stated

in an SMP that is mutually agreed, in writing, by both parties.
(An example is shown below)

All work at subcontractor facilities is overseen by Buyer Quality Assurance Personnel in accordance with established Subcontractor Management Plans (SMP) to assure Products that are in compliance with all requirements set forth by the program and is of the highest level of quality.

49. FOREIGN OBJECT DEBRIS

Suppliers (and sub-tier suppliers) shall have a program for the prevention, detection, and removal of foreign objects from its products. Packaging requirements shall define methods to prevent shipping damage and exclude foreign objects and contaminants.

50. FOREIGN OBJECT DEBRIS (FOD) ELIMINATION PROGRAM

Seller shall maintain and implement a documented FOD control & prevention program incorporating all the functional requirements of NAS-412.

51. REACH COMPLIANCE

Seller warrants and agrees that each chemical substance or its preparations on their own or contained in goods sold or otherwise transferred to Buyer is pre-registered if required, and registered if required, under Regulation (EC) No. 1907/2006 ("REACH"), is not restricted under Annex XVII of REACH and if subject to authorization under REACH, is authorized for Buyer's use. Seller shall notify Buyer if it decides not to pre-register or register substances that will be subject to registration under REACH and that are contained in goods supplied to Buyer or supplied to Buyer on their own at least 12 months before their registration deadline. Upon request from Buyer, Seller shall provide Buyer with access to all relevant information on substances meeting the criteria under REACH Annex XIV (the "candidate list") including the name of the substance, where the substance is used, and sufficient information to allow Buyer to safely use the goods or fulfill its own obligations under REACH.

52. Ethics; Suppliers shall ensure persons are aware of their contribution to product or service conformity and safety and the importance of ethical behavior.