



## **QAM-001 Supplier Flow Down Requirements**

Astronics Connectivity Systems & Certification (CSC) and Astronics Armstrong Aerospace (referred to as Astronics through-out the rest of this document) are wholly owned subsidiaries of Astronics Corporation. Astronics manages an ISO 9001, ISO 13485 and an AS9100 certificated quality management system that is regulated by the FAA and the FDA. Astronics maintains an FAA and EASA 14 Part 145 repair station. Astronics also maintains an environmental management system certified to ISO 14001. Suppliers to Astronics contribute to the overall conformity and safety of Astronics products and services and are therefore critical partners in the overall success of Astronics. Suppliers are to follow ethical behavior as identified in the Astronics Corporation Standard Purchase Order Terms and Conditions (PRF-015) and meet the requirements of this document (QAM-001) to ensure they can support Astronics requirements. Suppliers required to be on site at Astronics will also be required to review and follow the requirements of the Visitor/Contractor Environmental Health and Safety Requirements (EVF-004).

This document QAM-001 is applicable to all individual purchase orders issued by Astronics unless exceptions and modifications have been specifically agreed to in writing and signed by authorized representatives of Supplier and Astronics. Exceptions must be identified and approved by Astronics as documented on the Supplier Qualification Survey (PRF-003). The Supplier shall flow down all applicable product, regulatory, and quality requirements (including requirements for traceability, documentation, and software) to the Supplier's sub-tiers. The Supplier is responsible for ensuring and validating the compliance of the Supplier's sub-tiers and maintaining documented evidence of such.

The objective is to work with Suppliers to achieve Astronics goals of receiving defect- free products, on-time deliveries, and competitive costs through continual improvement of processes and product performance. Suppliers are selected and approved as defined in the Astronics procedure, Supplier Selection and Management (PRP-002). Confirmation of acceptance and ability to meet the requirements of this document (QAM-001) are completed as part of an on-site audit or as documented in a completed Supplier Qualification Survey (PRF-003).

### **GENERAL REQUIREMENTS**

#### **1. ORDER ACCEPTANCE**

Upon receipt of contract or purchase order, the Supplier shall evaluate the risk and determine their ability to meet all PO requirements including the manufacture and inspection of all specified design characteristics and shall ensure that all information required to fulfill contract or purchase order is available. Supplier shall notify the Astronics if any engineering revision levels received conflict with the revision levels on the Purchase Order. Purchase order review shall lead to acknowledgement receipt sent to the Astronics. Astronics always expects the Supplier to have enough capacity to meet quoted demand. Supplier shall not relocate or subcontract any contracted part, assembly or component(s) without written notification and acknowledgment from Astronics.

#### **2. COMMUNICATION**

All communications related to the fulfillment of Purchase Order(s) shall be carried out through the Astronics' Procurement office or the department, which places the Purchase Order(s). Any Changes to the technical and quality requirements are not valid unless authorized in writing by Astronics.

#### **3. ENGLISH LANGUAGE REQUIREMENTS**

Supplier shall submit all documents in the English language. This includes all sub-tier documentation provided in the certification package.

#### **4. ASTRONICS/ASTRONICS' CUSTOMER/GOVERNMENT SURVEILLANCE AT SUPPLIER'S FACILITY (RIGHT OF ACCESS)**

Astronics reserves the right for it or its representatives, such as its Customer or the US Government (collectively), to conduct surveillance and/ or audits for the purpose of validation of processes, products and quality system at the Supplier facility or at lower-tier Suppliers. Supplier is required to provide Astronics' representatives with



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reasonable facilities and equipment and access to support those activities. Supplier also agrees to accept this requirement without additional charge to Astronics. Verification of such processes, products, and/or quality systems shall not constitute acceptance of any items to be delivered by Supplier, nor relieve Supplier of its obligation to furnish items meeting the applicable drawings and specifications.

### **5. QUALITY MANAGEMENT SYSTEM REQUIREMENTS**

Suppliers are required to maintain a quality management system, preferably certified.

- A. Suppliers, supplying parts to be used on aerospace products are required to maintain a quality management system that meets AS9100 requirements; AS9100 certification is preferred.
  - i. Upon request, the Supplier will grant Astronics access to the “tier two” assessment results data contained within the IAQG OASIS.
  - ii. Supplier shall notify Astronics of any changes in its certification, registration, or accreditation within 48 hours of receiving notification of the change.
- b. All other Suppliers are required to maintain a quality management system that is ISO 9001 compliant; ISO 9001 certification is preferred.
  - i. Supplier shall notify Astronics of any changes in its certification, registration, or accreditation within 48 hours of receiving notification of the change.
- c. For companies that do not meet the requirements above, approval will be determined based on the Supplier Qualification Survey and/or Supplier audit as documented on the Astronics’ Supplier Qualification Survey (PRF-003).

### **6. TRAINING**

The Supplier shall demonstrate that the organization and its personnel are qualified to perform the scope of work in which they are to be approved for. The Supplier shall have a training plan or matrix for their employees to ensure they are qualified to complete the work as required by Astronics, including the training on ethical behavior and their contribution to product or service conformity and product safety and maintain records of trainings completed, track certification expiration dates and set retraining intervals as necessary.

### **7. INVOICES/PAYMENT**

Invoices and payments are addressed in the Terms and Conditions. Invoices are to be sent to the attention of Accounts Payable when mailed, and to a representative of the Finance department if sent electronically (CSC.AP@astronics.com). Astronics will provide the appropriate contact information when requested. Invoices must match Astronics purchase order terms and prices for all items. All changes and/or errors identified on the purchase order must be addressed prior to shipment.

### **8. DOCUMENTATION**

All documents including drawings and specifications, whether issued by Astronics, Industry, Government, or Astronics’ Customers, is considered part of the Purchase Order requirements, when specified or referenced. The Supplier shall deliver to the revision level indicated on the Purchase Order (PO).

The Supplier is responsible for the control of Astronics proprietary documents and for ensuring that they are controlled in order to preclude their use for anything other than Astronics products. The Supplier is responsible for acquiring copies of industry or government documents and/or standards available from commercial sources. Any problem experienced by the Supplier in obtaining required documents should be brought to the immediate attention of the Astronics procurement department prior to acceptance of order.

### **9. CHANGE NOTIFICATION**

Supplier will make no change to material, process, manufacturing location, Sub-Suppliers or tooling related to Astronics orders without prior written notification to Astronics. Changes to processes, product or services



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including changes of external providers or locations of manufacture must be made to Astronics 60 days in advance, in writing, for approval. Changes to products and services, methods, processes and equipment must be reapproved with the acceptance of a new first article inspection to release the new product or service. Tooling and equipment changes do not include routine maintenance performed with the intention of keeping the tooling or fixturing operating with requirements. (should this be in tooling maintenance or both?) Astronics must be notified by email when tooling is being modified. Supplier will flow down the requirement for change control and notification to their sub-tiers. In the event that Astronics changes a requirement, Astronics will provide the Supplier with any required disposition of stock instructions. Changes, both temporary and permanent, do not apply to work in process under previously issued Purchase Orders unless a change order is issued.

### 10. DESIGN CONTROL

Where Astronics is ordering custom material, Astronics or Astronics' customers hold design and development control and only approved changes can be made as approved by Astronics or Astronics' Customers' Engineering in writing.

- A. For Suppliers supplying parts used on aerospace, Notification of Change (NOC) should be initiated in accordance with AS9116 (or equivalent process) when changes to design data are made by the Supplier that impact articles delivered to Astronics. All design data changes shall be treated as Class I changes in accordance with AS9116, which require Astronics' engineering approval prior to shipment of affected articles. The Supplier will identify, on the Certificate of Conformance and/or packing sheet, the as built revision level of the end item product being delivered.

### 11. ASTRONICS/ASTRONICS CUSTOMER OWNED MATERIAL AND EQUIPMENT

Supplier shall document, identify & protect Astronics' property. Astronics' property includes, but not limited to, intellectual property, tooling, furnished information and data for design, production, testing and inspection, and production material. Supplier is responsible for maintaining Astronics' owned property and communicating to Astronics when Astronics' property is damaged and/or lost in writing. Supplier shall notify Astronics prior to destruction of any Astronics' furnished property in writing for approval. Letter of destruction will also need to be submitted to Astronics. If Astronics has provided the raw material for an order, no material substitution is allowed unless authorized in writing by Astronics. The Supplier shall not return any furnished property without prior approval of Astronics.

### 12. INTERNAL MANUFACTURING PLAN

Supplier and its sub-tier Suppliers shall implement and utilize an internal manufacturing plan (internal traveler/routing control process/control plan) to assure each fabricated article has successfully completed all required process, inspection and test steps. Key steps in the process of fabrication are to be identified and validated by inspection that includes a signoff by a Quality representative to verify successful step completion.

### 13. TRACEABILITY

Supplier shall maintain full forward and backward traceability down to the component and raw material level. This requirement includes maintaining traceability of all fabricated articles back to raw material part number, lot number(s), and date code(s).

- A. For parts to be supplied for aerospace assembly, all purchased products on custom assemblies where COTS items are used shall be traceable.
- B. All material used to fulfill a given purchase order shall be traceable to the original manufacturer's lot or date codes and supporting approval documentation (e.g., purchase orders & certificates of conformance). This also applies to test data and reports, as specified in the applicable purchase order, contract or specification. The Seller must be able to trace these components to all delivered items.

### 14. WORKMANSHIP

Workmanship standards shall be in accordance with the best industry standards. Required specifications are identified on the drawing or purchase order for the material being purchased.



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### 15. SAFETY

Suppliers and sub-Suppliers shall establish the process to evaluate and ensure the safety of all products and services. All Astronics Suppliers will ensure that any issues relating to product safety throughout the provision of products to Astronics are reported to us within 72 hours. The Supplier will ensure that their relevant personnel are made aware of their contribution to product safety.

### 16. RECORD RETENTION

Supplier shall maintain adequate records of inspections, tests, and other quality assurance activities which validate product acceptance. Records shall provide objective evidence of the quality assurance operations performed, the results obtained, and corrective actions taken. Quality records shall be maintained to keep them legible, readily identifiable and retrievable. Pencils, White Out and Corrective Tape shall not be used. Corrections to documents can be accomplished by the following methods: Reprint the document or cross out the incorrect data with a single line, initial (Sign or stamp) and date.

A person may not make or cause to be made any fraudulent, intentionally false or misleading statement in any record or report that is kept, made, or used to show compliance (14 CFR Part 21.2).

Unless a different period is specified in the Purchase Agreement, supplier quality, purchasing and manufacturing records that were used to produce the Goods shall be retained for a minimum of 20 years from the date of the last shipment for parts supplied to be used on Aerospace parts and 10 years for non-aerospace parts. At the expiration of this period, Astronics reserves the right to request delivery of such records to support some products that require records to be maintained for the life of the product. In the event that Astronics chooses to exercise this right, Supplier shall promptly deliver such records to Astronics at no additional cost on media agreed to by both parties

The Supplier shall make the records available within 2 business days of the request for access.

### 17. INSPECTION

The Supplier shall complete all inspections (receiving, in-process, final) necessary to confirm that the material conforms to drawing and/or required specifications and shall document the inspections and make the documentation available as objective evidence upon request.

- A. For suppliers supplying parts to be used in aerospace assemblies, the Supplier should establish and maintain an inspection & test system in compliance with the current requirements of SAE AS9003 - "Inspection and Test System.

### 18. SAMPLING PLANS

An approved sampling plans shall be used for product acceptance. Examples of approved sampling plans include, but are not limited to:

- ANSI/ASQ Z1.4-2008 (2013) AQL 2.5 where C=0
- SAE ARP9013 with minimum protection levels meeting SAE ARP9013 Figure B1, where C=0
- SAE AS9138 Table A1 and C=0
- 100% inspection may be required for in-process and final inspection as specified on the drawing or purchase order.

### 19. CONTINUOUS IMPROVEMENT

The Supplier shall implement a continuous improvement program for process effectiveness and product quality. Suppliers are expected to use appropriate analysis of data to identify defects or opportunities to prevent defects, with the goal of zero defects. Such records are expected to be made available to Astronics upon request. The Supplier should use data analysis to understand if its product conforms to requirements, if its processes achieve planned results, or if process or Supplier trends may result in defects. Suppliers are expected to utilize the



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appropriate statistical techniques, when making decisions about products and monitoring process performance (i.e. first pass yield, SPC, etc.).

### **20. MONITORING AND MEASUREMENT EQUIPEMNT (CALIBRATION)**

Supplier shall select accurate monitoring and measuring equipment for the inspection and tests being completed. Supplier shall establish a calibration system to control, calibrate and maintain inspection, measuring and test equipment (including test software) consistent with the ISO 17025 or ANSI/NCCL Z540-3 or ISO 10012.1, and shall immediately notify Astronics in the event such equipment is found to be out of calibration. Supplier shall demonstrate the conformance of product to the specified requirements and traceable to the National Institute of Standards and Technology (NIST) standards. Inspection, measuring, and test equipment shall be used in a manner that ensures that measurement uncertainty is known and is consistent with the required measurement capability.

### **21. ON-TIME DELIVERY**

Supplier shall (strive to) maintain on-time delivery level of 100% on all Items. The Supplier shall inform Astronics as soon as they are aware of any incidents or anomalies likely to affect the fulfillment of contract or purchase order (delivery date, product conformity). If requested by the Astronics, the Supplier shall present a recovery plan.

### **22. NONCONFORMING MATERIAL**

Materials received against a purchase order will be inspected and or tested at Astronics to verify full conformance to all specified requirements. Failure to meet any specifications is considered a nonconformance may result in immediate rejection and return of the material at the Supplier's expense. Nonconforming material needs to be identified and segregated to prevent escape. Nonconforming product that can be reworked to meet all product requirements within the existing manufacturing process are not required to be submitted to Astronics for disposition. All rework shall have documented work instructions and shall include reinspection. Material disposition for scrap shall be segregated and controlled until rendered unusable.

### **23. MATERIAL REVIEW BOARD (MRB)**

Material Review Board authority is not delegated to the Supplier - dispositions of "use as is" or "repair" are not authorized. Supplier shall submit waiver/deviation report to the Astronics for any nonconformance requiring MRB disposition to "use as is" or "repair". The report shall contain a final disposition by Astronics' MRB prior to shipment. The ensuing shipments shall include evidence of the approved disposition with each lot. Salvage of components from an assembly for use on another assembly must be pre-authorized by Astronics' engineer in writing.

### **24. NOTIFICATION OF PRODUCT ESCAPE**

Supplier shall notify Astronics within 24 hours upon positive confirmation of a potential quality, reliability, or safety problem with material that has already been delivered to Astronics. The Astronics' Nonconformance Form (QCF-048) or equivalent shall be used. Note: Nonconformance Form is based on AS9131 – Aerospace Series - Quality Management Systems.

### **25. RETURN MATERIAL AUTHORIZATION (RMA)**

Supplier shall have an RMA process for the return of articles that have been determined to be damaged, defective, or to have failed to meet quality or performance standards. Supplier shall respond to RMA requests within forty-eight (48) hours of submission. Supplier shall perform failure analysis investigations on all product failures returned under RMA. Product(s) rejected by Astronics and resubmitted by Supplier shall be clearly identified as re-submitted product(s) and must also be documented on Supplier's shipping documents that product(s) delivered are either "replacement" or "reworked" product(s). Returned product must be re-inspected to ensure it meets specification and include new C of C with the shipment.



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### 26. CORRECTIVE ACTION

Astronics may issue a corrective action to the Supplier because of a specific incident or trends in Supplier performance. When a corrective action is requested, the Supplier shall document the response using an Astronics provided form or a format approved by Astronics. The Supplier is responsible for responding to the corrective action within the established due date or requesting an extension prior to the corrective action becoming past due. Root cause analysis shall be completed using best business practices such as 5 why, fishbone diagram, cause and effect diagram, etc. Astronics has the right to reject any corrective action response and may request further investigation and corrective action. The Supplier shall develop and implement a containment action to prevent it from happening again. The containment action, including the root cause of the problem, is required to be implemented within 48 hours of the receipt of the corrective action. Failure of a Supplier to respond or complete effectively may result in the reissuing of the corrective action or change in the Suppliers approval status. At a minimum, a meeting will be held with the Supplier to reSiew the issues. Corrective action to prevent it from occurring again. Corrective action remains open until Astronics confirms completion and effectiveness of corrective action on future orders. Preventive Action is action taken to eliminate the cause(s) of a potential exception, nonconformance, or other undesirable situation, in order to prevent occurrence and shall be included as part of the corrective action as applicable.

- A. For Suppliers supplying parts used on Aerospace parts, the corrective action shall have a root cause and corrective action process consistent with the 8D methodology in AS13000, as required.

### 27. GOVERNMENT CONTRACT PROVISIONS

If the Purchase Order indicates that it has been issued under a Department of Defense prime contract or subcontract thereunder, Astronics shall identify additional requirements that shall apply and will prevail in the event of any inconsistency with the forgoing terms and conditions. Supplier agrees to flow down appropriate provisions in each subcontract associated with this Purchase Order.

### 28. CERTIFICATION/DECLARATION OF CONFORMITY

Items on this purchase order must be accompanied by Certificate of Conformance (C of C) issued by the Supplier 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 Supplier and be available for review upon request:

- A. Supplier's Name and Address
- B. Date Certification Issued
- C. Astronics' Purchase Order Number
- D. Astronics' Part Number and Part Nomenclature and Revision Level
- E. Manufacturing Lot Number
- F. Serial Number(s), if applicable
- G. Signature and Title of a Company Authorized Representative (Aerospace Mandatory)
- H. Certification of "Special Processes" either as part of the body of the Certificate of Compliance being submitted or as an attachment thereto.
- I. Country of Origin (If not on packing list)
- J. Material Lot #/Heat # for Raw Materials Used on Order
- K. Expiration Date for Limited Life Products (If not on packing list)
- L. Additional requirements as required per drawing or p.o.

### 29. ACCEPTABLE SIGNATURES

Supplier system shall provide for the control of acceptable signatures or stamps as applicable with regard to authority. This control shall include provisions for stamp assignment, issuance, and use. NOTE: Signatures must be





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rendered in ink and the signatories name printed alongside the signature. For computer generated signatures, the Supplier's system shall provide for the control of documents which do not bear the original signatures or where the name(s) of authorized official(s) are computer generated.

### 30. FIRST ARTICLE INSPECTION (FAI) REPORT

The primary purpose of FAI report is to validate that product realization processes are capable of producing parts and assemblies that meet design requirements. First article inspections validate the process and confirm that all requirements identified on the drawing are met. It's the seller responsibility to provide a full or a partial FAI for affected characteristics, when any of the following conditions occurs:

- A product changes.
- A change in ownership.
- A change in the design characteristics affecting fit, form, or function of the part.
- A change in manufacturing source(s), process(es), inspection method(s), location of manufacture, tooling, or materials that can potentially affect fit, form, or function.
- A change in numerical control program or translation to another media that can potentially affect fit, form, or function.
- A natural or man-made event, which may adversely affect the manufacturing process.
- An implementation of corrective action required to complete a previous FAI.
- A lapse in production for two years shall require an update for any characteristics that may be impacted by the inactivity. This lapse is from the completion of last production operation to the actual restart of production

All parts the seller manufacturers for Astronics must maintain records of the full & partial First Article Inspection Reports and be available for Astronics review. The Supplier shall conduct First Article Inspections that are in compliance with the Requirements of AS9102 for parts used on Aerospace products or equivalent as approved for other parts. A single unit/part, representative in every way of the product to follow, shall be identified and designated 'First Article', and identify the packing (box) "Contains FAI Unit/Part". The First Article Inspection Report should be sent before the shipment or with the shipment it applies to.

### 31. FIRST PIECE INSPECTION

First piece inspection is done on the first piece of a production line set up and confirms that critical dimensions are met. First piece inspection is recommended for each set-up and shall be documented.

### 32. CONTAMINATION AND DAMAGE CONTROL

Supplier shall provide materials, parts, and products free of any contamination, damage or objects not listed on the drawing &/or specifications. Supplier should have a Foreign Object Debris/Damage Prevention process in place.

- A. Suppliers supplying parts to be used on aerospace products shall comply with NAS412 Foreign Object Damage/Foreign Object Debris (FOD) Prevention and AS9146 - Foreign Object Damage (FOD) Prevention Program - Requirements for Aviation, Space, and Defense Organizations.
- B. For use on medical products, the supplier is expected to protect product, equipment, and personnel against potential contamination. The supplier should document cleanliness requirements, monitor conditions or make special arrangements to protect product quality and health of personnel. When a sterilization process is necessary, the supplier is expected to record its process parameters and maintain traceability for each production batch.

**33. PRODUCT SERIALIZATION**

As required, as defined on the applicable drawings, assemblies such parts as circuit boards, hard drives, etc., shall be serialized, applied on all products, and recorded on all applicable documentation by Supplier. The assigned serial numbers shall not be altered or duplicated or replaced without prior written authorization from Astronics.

**34. PART LABELING/MARKING**

Unless, otherwise specified in the approved drawing, parts should be marked in a fashion that identifies supplier's name, date of manufacturing and unique part serialization, where required. Serial numbers shall not be altered, duplicated, or replaced without prior written authorization from Astronics. When physical limitations exist on part itself, information shall be recorded on part packaging. The supplier shall use permanent marking.

AS478 Identification Marking Methods or MIL-STD-130 Identification Marking of U.S. Military Property may be used as guidance when determining part marking methods.

**35. ELECTROSTATIC DEVICE (ESD)/MOISTURE SENSITIVE DEVICE (MSD) SENSITIVE PARTS**

- A. If applicable to Supplier's products, Supplier shall provide protection to prevent physical and Electro-Static Discharge (ESD) damage. ESD sensitive materials, assemblies, parts, components, etc., shall have a sealed primary container that is ESD compliant. ESD warning labels shall be visible at the point of access. Dust caps used in conjunction with ESD material shall be ESD compliant as defined in EIA 2020.
- B. ESD handling and packaging should comply with the following guidelines:
  - i. EIA 583 Packaging Material Standards for Moisture Sensitive Items
  - ii. JESD625B Requirements for Handling Electrostatic Discharge Sensitive (ESDS) Devices
  - iii. ANSI/ESD S20.20-2014 Protection of Electrical and Electronic Parts, Assemblies, and Equipment
  - iv. ANSI/ESD S541-2018 Packaging Materials for the Protection of Electrostatic Discharge Susceptible Items
  - v. The outer packaging shall be marked with Symbol B627 ESD Warning Label showing that the content may be damaged by electrostatic discharge per MIL-STD-129N, Military Marking for Shipment and Storage
  - vi. MIL-STD-2073-1D Standard Practice for Military Packaging
  - vii. MIL-PRF-81705 ESD and Static Shielding Materials
  - viii. MIL-STD-1686C Military Standard: Electrostatic Discharge Control Program for the Protection of Electrical and Electronic Parts, Assemblies and Equipment
  - ix. EN61340-5-1:2016 Electrostatics
  - x. IPC/JEDEC J-STD-033 Handling, Packaging, Shipping and Use of Moisture, Reflow, and Process Sensitive Devices
  - xi. Where applicable, electronic products sensitive to moisture shall be marked and packaged according to J-STD-020.
  - xii. The use of pink poly ESD bags is prohibited for the primary ESD container.

**36. PACKAGING AND LABELING**

Materials are to be packaged and preserved to prevent damage or deterioration during shipping, handling and storage, and are to be labeled to properly identify the contents of the package and include special handling requirements of its contents, where required. Materials are also to be packaged in a way so that materials can be easily removed and replaced packaging for the purposes of inspection. Materials are to be packaged and preserved according to defined drawings and/or specifications where defined. Supplier & Supplier's Sub-Tiers are responsible for all packaging related damages & failures.



**A. Packaging**

- i. **Aerospace Parts** - Supplier should package according to best commercial packaging practices using ATA-300 requirements, ASTM-D- 3951-88 or MIL-STD-2073 as guidance.
- ii. **Dunnage** - Recyclable or environmentally friendly packaging is strongly preferred. Newspaper wadding, loose-fill dunnage, macerated (shredded) paper, peanut foam, eco- foam, shredded materials, discarded paper, grocery paper sacks, bags made from bubble wrap and broken, or recycled foam-in-place are not acceptable as packing (dunnage) materials in any container. Paper wraps, envelopes or bags as exterior packages or any packaging material in the form of egg boxes, egg crate trays or dividers may be used.
- iii. **Staples** - Staples are prohibited as a means of closure for exterior shipping containers. Staples are permitted in non-closure portions of box type containers, such as bottom closure, side stitching, etc. The portion of the container meant to be opened must remain staple-free. Staples and other penetrating forms of unit package closure also are prohibited for use on bags (polyethylene or paper), bubble wrap, sheet foam, Kraft paper or other intermediate or interior containers. These types of unit packages must be heat sealed (if applicable) or sealed by folding, taping, Zip-Lok, or zipper sealing, etc.
- iv. **General Requirements**
  1. The Supplier must comply with all legal and regulatory requirements concerning the manufacture, packaging, storage, packing, sale and delivery of the goods.
  2. In case of delivery composed of several manufacturing batches, the Supplier shall separate and identify each batch.
  3. Any packaging material which may cause Foreign Object Damage (FOD) or part contamination, part obstruction or leave non-preservation residue shall not be used.
  4. Supplier shall package assemblies using non-adhesive protective film, or other equivalent non-adhesive packaging material, to protect surfaces from general handling damage.
- v. **Temperature Sensitive Parts**
  5. Packages must be adequately thermally insulated to ensure temperature requirements are maintained through reasonably anticipated transportation, in-transit delays, transfers and destination.
  6. Where goods are manufactured, frozen or cryogenically stored product, the supplier shall display the type of storage necessary on the outside of the package.
- vi. **Hazardous and Dangerous Goods**
  7. Chemicals shall be identified, labeled and one (1) copy of the SDS shall accompany each shipment for all chemicals as required by OSHA 29 CFR 1910.1200.
  8. The Supplier shall define, mark, label and prepare for hazardous goods, dangerous material and/or dangerous equipment for shipment in accordance with Department of Transportation HM181, CFR Title 49, "Dangerous Goods", as classified by IATA, IMDG or ICAO.
  9. All packaging shall follow the United States Toxics in Packaging Prevention Act (TIPPA).
  10. Fluid tight packaging shall be as required by hazardous material / dangerous goods regulations and as follows: Bagged and the heat-sealed closed in accordance with MIL-DTL-117. The bags shall be made from MIL-PRF-22191, Type I material also known as "bearing bag" material. This method is required for corrodible parts which have contact preservative.
  11. Lithium batteries shall be shipped per <http://hazmat.dot.gov> and <http://www.iata.org/lithiumbatteries> requirements.
- vii. **Electronic** - Components supplied on Tape and Reel shall be packaged in accordance with EIA-481 and must be unidirectional in orientation for automated placement.

**viii. Wood Containers and Pallets**

12. Containers, dunnage, pallets & skids other than those containing non-manufactured coniferous lumber shall be used when possible. If containers with solid wood components must be used, they shall be certified and marked bug free in accordance with ISPM 15 and/or as indicated by <http://www.aphis.usda.gov>.
13. Effective September 15<sup>th</sup>, 2005, US customs requires all import shipments to package in compliance with the United States Department of Agriculture' (USDA) Animal and Plant Health Inspection Services (APHIS) import regulation for wood packaging material (WPM). The rule requires WPM, such as pallets, crates, boxes, and dunnage used to support or brace cargo, to be treated as marked. In cases of noncompliance, the WPM will be subject to immediate export along with the accompanying cargo.

**B. Packing List**

- i. A physical copy of the Packing Slip or Bill of Lading should be affixed to the outermost container and an additional copy placed inside the container.
- ii. The packing slip must contain the following information:
  14. Seller's Name, Address and Phone Number
  15. Sold To/Ship To
  16. Date Shipped
  17. Packing Slip Number
  18. Astronics P.O. Number
  19. Part Number/Revision Level/Quantity Shipped/Part Nomenclature
  20. Limited Life Date (if applicable)
  21. Number of boxes
  22. Purchase Order Line Number (preferred)
  23. Tracking Number (preferred)
  24. Serial Numbers (if applicable)
  25. Supplier Lot Number
  26. Country of Origin (If not on C of C)

**C. Labeling**

- i. In addition to the labeling requirements for packaging, bar coding with human readable text is also preferred. Bar codes shall be easily read by optical scanners. Labels shall be permanently attached to the exterior of the carton or container.
- ii. Labels shall be located to allow the markings to be easily read when stored on shelves or stacked, and to ensure marking will not be destroyed when the container is opened for inspection.
- iii. Supplier labeling is expected to meet applicable regulations and standards, remaining legible and attached to product during normal handling, storage and distribution conditions.
- iv. Label shall include the Suppliers name, part number, revision level, part nomenclature (preferred), quantity, serial numbers (if applicable, preferred), production lot number, date of manufacture.
- v. If applicable or when required, the Supplier is expected to ensure labels include handling and storage instructions and remain legible and affixed to the product.

**37. OVERSHIPMENTS**

Supplier is instructed to ship only the quantity of Product specified in this Purchase Order. Astronics reserves the right to return at Supplier's expense any shipment in excess of the quantity stated in this Purchase Order, if not approved prior to shipment.

**38. BUSINESS CONTINUITY AND RECOVERY**

Suppliers shall define and implement a plan to mitigate the potential impact of risks to the normal operation of their business in the event of a disaster. The primary objectives are to safeguard company assets



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(employees, facilities, equipment and other capital assets), maintain customer service and to communicate responsibly with all those who have a need to know should the Supplier experience a significant business disruption. The Business Continuity and Disaster Recovery Plan addresses the key areas necessary in the event of a disaster occurrence, to ensure the Supplier has a plan to maintain business operations; maintain financial and accounting activities; meet contractual obligations and requirements; meet legal and regulatory requirements; safeguard company assets and maintain customer service. A copy of the Supplier's Business Continuity and Disaster Recovery Plan should be provided to Astronics upon request.

### **39. INFORMATION SECURITY**

Suppliers shall implement effective information security programs in order to handle and manage customer information, personal information, and information assets such as technologies, quality, products and services provided. Suppliers shall formulate policies concerning information security and disclose them on the website or in any other means. In addition, Suppliers shall conduct risk assessment and take corrective measures by establishing management systems. The organization is expected to assess internal systems, monitor and improve information systems to ensure adequate data protection exists. As a recommendation, Suppliers should consider alignment with the ISO 27001 standard—the internationally applicable Information Security Management System.

### **40. PREVENTIVE MAINTENANCE**

The Supplier shall establish and maintain tools, tooling, equipment and fixtures via a Preventive Maintenance program. The program shall include accommodations for Customer owned items to ensure they are properly maintained, calibrated and remain in good working order. The Supplier shall also establish and maintain procedures for implementing new tools, tooling, equipment and fixtures to ensure the items are properly installed and validated.

### **41. ENVIRONMENTAL MANAGEMENT SYSTEM (EMS)**

Astronics is committed to developing manufacturing processes that are inherently less wasteful and hazardous, minimizing or eliminating adverse environmental impacts. It is recommended that the Supplier have an Environmental Management System (EMS) according to, or as a minimum, to be in compliance with ISO 14001:2015 requirements.

### **42. LOT CONTROL**

Single Lot Control for each PO line is preferred. In those cases where the Supplier elects to use more than one lot of raw material, the Supplier shall ensure, document and furnish positive traceability of each individual product to the raw material certification/test report that represents the raw material from which each of the products was manufactured. Traceability shall be provided by identifying the raw material heat, lot, batch or melt number from the certification/test report on the product and/or on packaging (when used), or the products segregated and identified.

### **43. LAST ARTICLE INSPECTION (LAI)**

In case where a process or product is to be discontinued at a Supplier, Astronics may require a Last Article Inspection Report (LAIR) from the current Supplier. This report is identical to a First Article Inspection Report (FAIR) and is provided by the Supplier for one of their last production runs, or processing runs.

### **44. SHELF LIFE CONTROL**

Supplier shall maintain a documented system for shelf life control items where acceptability is limited by maximum age. The system shall include a method of identifying and controlling such items. Supplier shall provide documentation with the shipment against this order defining when useful shelf life was initiated by the manufacturer or converter, as appropriate. When useful shelf life will expire, documentation shall include batch or



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lot code information. Supplier shall assure that a minimum of 80% useful shelf life or a minimum of 2 years remains at time of shipment to Astronics unless otherwise stated in the Astronics Purchase Order.

For electronic components, at the delivery date, the date-code shall not be older than 2 years.

### 45. SPECIAL PROCESS CERTIFICATION

Special processes are manufacturing processes whose resulting output cannot be fully verified by subsequent monitoring or measurements performed on the product and deficiencies become apparent only after the product is in use. The Supplier shall identify all special processes used for product manufacturing. Special processes shall be qualified by the Supplier before utilization. Process significant parameters shall be identified, controlled and recorded. These requirements also apply to sub-contracted special processes. The special process qualification file shall be consulted by the Buyer on request.

- A. All Special Process Suppliers that supply parts to be used in Aerospace products shall be Nadcap accredited for the following special processes: Chemical Processing, Coatings, Heat Treating, Materials Testing Laboratories, Nonconventional Machining and Surface Enhancement, Nondestructive Testing, Welding. Note: Special process categories are defined by Performance Review Institute (PRI). Nadcap or International Laboratory Accreditation Cooperation (ILAC) requirements may be further defined by the Member.

### 46. INSPECTION, MEASURING AND TEST EQUIPMENT

Suppliers of Inspection, measuring and test equipment 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.

## REQUIREMENTS SPECIFIC TO SUPPLIERS SUPPLYING PARTS TO BE USED ON AEROSPACE

### 47. ADVANCED PRODUCT QUALITY PLANNING (APQP)

Advanced Product Quality Planning documents are to be submitted as required as defined on the purchase order. Such documents include, but are not limited to control plans, failure modes and effects analysis (FMEA), capability studies, etc. For Suppliers of aerospace parts, such documents should be in a format as identified in AS9145, Aerospace Series – Requirements for Advanced Product Quality Planning and Production Approval Process.

#### A. CONTROL PLAN

A documented description linking manufacturing process steps to key inspection and control activities. The intent of a control plan is to control the design characteristics and the process variables to ensure product quality.

#### B. Measurement System Analysis (MSA)

Supplier shall perform MSA on all measurement systems used to measure key characteristics. When performing MSA, supplier shall comply with the requirements of AS13003 Table 2 with the following exception: The acceptable precision to tolerance ratio (Gage R&R) is  $\leq 20\%$  Note 1: Appropriate action should be taken to improve the measurement process when the requirements of AS13003 Table 2 have not been achieved.

#### C. RISK MANAGEMENT (PFMEA)

Supplier shall reduce process risk and variation through the use of Process Failure Mode and Effects Analysis (PFMEA), control plans, and process control methods. The Supplier shall implement a Process Failure Mode & Effects Analysis (PFMEA) or a similar tool to use for identifying variation in product / process characteristics, their effects and causes, and to develop solutions that will minimize/eliminate the effects



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of variation in products as required per the purchase order. The Supplier's PFMEA program shall be submitted to Astronics for review and approval prior to start of work on the Contract.

### D. KEY CHARACTERISTICS

A KC is a product requirement or specification of a feature, process, or material whose variation has influence on product safety, fit, form, or function, or manufacturability. KCs are identified for continual monitoring (variation management) because they are critical to safety, functionality, or business needs, and they are at some risk of not being achieved due to process variations. KCs can be identified as features on the assembled product, individual component level, and / or geometric relationships between features on non-adjacent parts. As a result, monitoring activities may take place at any point in the manufacturing process. The Supplier is to implement KC measurement processes in accordance with a Product Manufacturing Plan (or Industrial Dossier) as applicable (See AS9103 Variation Management of Key Characteristics).

### 48. HUMAN FACTORS

The Supplier should ensure that Human Factors that may (or have) cause a detrimental effect on product conformity or safety is considered during the contract / planning stage. Human Factors to be considered could be (but not limited to): The effect on personnel when working to tight timescales, personnel having to work excessive hours, personal circumstances which may affect a person's performance, ergonomics.

### 49. NON-DELIVERABLE SOFTWARE

Non-Deliverable Software is software used in the design, manufacture, inspection, test acceptance, or calibration that has a direct effect on a deliverable product. Suppliers shall have a documented procedure that outlines their translation process. The procedure shall include validation that data translation processes result in datasets which match and are traceable to the original dataset. See SAE ARP9005 Aerospace Guidance for Non-Deliverable Software.

### 50. FLAMMABILITY REQUIREMENTS

Raw materials that are either: cabin interior trim pieces (non-metallic), carpet, fabric, decorative laminate, thermoform plastic sheet stock, foam, Velcro, or upholstery; require the following additional material test reports on each production lot: 1. Carpet, fabric, and upholstery raw stock material and articles made from any combinations of these materials that are produced to Astronics' Engineering drawing requirements must be certified by the Supplier to have satisfied lot testing to show compliance with 14 CFR Part 25.853(a) 2. Thermoform plastic sheet stock and decorative laminate raw stock material and articles made from any combinations of these materials that are produced to Astronics' Engineering drawing requirements must be certified by the Supplier to have satisfied lot testing to show compliance with 14 CFR Part 25.853(a) and (d). Shipment Documentation: Each shipment shall be accompanied by a legible unaltered copy of the test report, unless verified and validated by Astronics' Quality Assurance representative at the Supplier's facility.

Supplier shall ensure that Fiber Optic Cables have been tested in conformance to Flammability requirements of Federal Aviation Regulations (FAR), Part 25.869, as applicable. Samples shall be provided to an FAA- approved testing facility for each lot of material purchased and certified prior to use. Traceability shall be ensured throughout the manufacturing process, and certification provided for each lot of cables tested. Each shipper should reference the material lot number used to fabricate the cables. Cable manufacturer data sheets, stating that the wire is in compliance with FAA flammability requirements, are not sufficient and not acceptable.

### 51. ALCOHOL AND DRUG PREVENTION PROGRAM

Supplier shall ensure that all U.S.-located personnel of Supplier and its subcontractors performing "hands on" work on commercial aviation material must be included in an FAA-registered drug and alcohol abuse prevention program in accordance with 49 CFR Part 40 "Procedures for Transportation Workplace Drug & Alcohol Testing

Program” for transportation employees and 14 CFR Part 120 “Drug & Alcohol Testing Program.” for those that work in a Part 145 repair station. Supplier shall provide evidence of participation in a compliant drug and alcohol program that meets these regulations.

#### 52. FULL MATERIAL DISCLOSURE

As requested, the Supplier shall provide Full Material Disclosure (FMD) declarations of the chemical composition of all materials, ingredients, products, and packaging provided to Astronics. FMD reporting shall be in accordance with standard IPC-1752 (XML format), or IPC-1754 (XML format) and requires Suppliers to submit the complete, accurate, and precise identity of parts, materials and weights/mass used in products provided to Astronics. If proprietary material composition cannot be disclosed then IAEG (International Aerospace Environmental Group) AD-SRT form, latest revision, shall be submitted. The form is located on the IAEG website. The current link is <http://www.iaeg.com/chemicalrpt/adsrt/>. Suppliers shall notify Astronics prior to any compositional changes and resubmit the material declaration.

#### 53. MANUFACTURING/TEST ACCEPTANCE SOFTWARE

The Supplier shall have a process to ensure the proper configuration control and operation of manufacturing inspection / test software (i.e. ATP) is used. Product Acceptance test software changes must be submitted and approved unless otherwise contractually defined and mutually agreed upon between Astronics and the Supplier.

#### \*REFERENCE WORKMANSHIP STANDARDS

- MIL-HDBK-454 General Guidelines for Electronic Equipment
- National Fastener Act
- MIL-STD-202 Department of Defense Test Method Standard Electronic and Electrical Component Parts (Solderability)
- MIL-STD-750 Test Methods for Semiconductor Devices (Solderability)
- MIL-STD-883 Department of Defense Test Method Standard Microcircuits (Solderability)
- IPC J-STD-002 Solderability Tests for Component Leads, Terminations, Lugs, Terminals and Wires
- NAS 410 Certification and Qualification of Nondestructive Test Personnel
- AS9006 Deliverable Aerospace Software Supplement for AS9100a
- AS9115 Quality Management Systems – Requirements for Aviation, Space and Defense Organizations – Deliverable Software
- IPC/WHMA-A-620 Requirements and Acceptance for Cable and Wire Harness Assemblies
- IPC J-STD-001 Requirements for Soldered Electrical and Electronic Assemblies
- IPC J-STD-003 Solderability Tests for Printed Boards
- IPC J-STD-004 Requirements for Soldering Fluxes
- IPC J-STD-005 Requirements for Soldering Pastes
- IPC J-STD-006 Requirements for Electronic Grade Solder Alloys and Fluxed and Non-Fluxed Solid Solders for Electronic Soldering Applications
- IPC-6011 Generic Performance Specification for Printed Boards
- IPC-6012 Qualification and Performance Specification for Rigid Printed Boards
- IPC-6013 Qualification and Performance Specification for Flexible/Rigid-Flexible Printed Boards
- IPC-6018 Qualification and Performance Specification for High Frequency (Microwave) Printed Boards
- IPC-2221 Generic Standard on Printed Board Design
- RTCA/DO-178 and/or EUROCAE ED-12 Software Considerations in Airborne Systems and Equipment Certification
- ASTM-D-3295 Standard Specification for PTFE Tubing, Miniature Beading and Spiral Cut Tubing
- MIL-I-7444 Military Specification Insulation Sleeving, Electrical, Flexible



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- MIL-I-22076 Military Specification Insulation Tubing, Electrical, Nonrigid, Vinyl, Very Low Temperature Grade
- MIL-I-23053 Military Specification Insulation Sleeving, Electrical, Heat Shrinkable
- MIL-PRF-55110 Performance Specification: Printed Wiring Board, Rigid General Specification For
- MIL-PRF-31032 Performance Specification Printed Circuit Board/Printed Wiring Board, General Specification For
- IPC-4553A Specification for Immersion Silver Plating for Printed Boards
- IPC-A-610 Acceptability of Electronics Assemblies Endorsement Program
- IPC-A-600 Acceptability of Printed Circuit Boards
- GEIA-STD-0006 Requirements for Using Solder Dip to Replace the Finish on Electronic Piece Parts
- GEIA-STD-0005
- IEC-TS62647-4 Process management for avionics - Aerospace and defense electronic systems containing lead-free solder - Part 4: Ball grid array (BGA) re-balling
- American Welding Society (AWS) Standards
- AS6081 Fraudulent Counterfeit Electronic Parts: Avoidance, Detection, Mitigation, and Disposition - Distributors
- MIL-PRF-50884 Printed Wiring Board, Flexible or Rigid-Flex, General Specification For
- IPC 7711/7721 Rework, Modification and Repair of Electronic Assemblies
- UL 61010-1 or EN 61010-1 UL Standard for Safety Electrical Equipment for Measurement, Control, and Laboratory Use; Part 1 General Requirements
- UL60950-1 or EN 60950-1 UL Standard for Information Technology Equipment – Safety – Part 1: General Requirements
- EN10204 Metallic Parts. Types of Inspection Documents