



# AMC PURCHASE ORDER QUALITY CLAUSE

The Quality Requirements listed below are applicable to the Purchase Order to the extent specified. The minimum requirements are listed in table 1 and are applicable for those product categories; however, additional Quality Requirements may also apply as specified on the Purchase Order.

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|---|--|--|--|
| Distributor<br>QR-3, 4, 24, 25, 28, 30, 31, 34, 35                                  | Limited Life Items<br>QR-15, 24, 30, 31, 34  | Fabricated Metal, Plastic<br>QR-2 3, 6, 7, 18, 19, 20, 21, 23, 24, 29, 30, 31, 32, 34, 36, 37,38 | COTS<br>QR- 1, 2, 3, 5, 6, 7, 12, 15, 21, 24, 25, 27, 28, 30, 31 |
| Printed Wiring Boards<br>QR-2, 3, 20, 22, 24, 30, 31, 34                            | Chemicals<br>QR-3, 9, 14, 15, 24, 30, 31, 34 | Raw Material<br>QR-2 3, 4, 16, 23, 24, 30, 31, 34  |  |
| Contract Manufacturer PCB Population<br>QR-2, 3, 24, 26, 27, 28, 30, 31, 32, 34, 35 | All Suppliers<br>QR-3, 24, 30                | AMC Special Processes<br>QR-2 3, 6, 7, 18, 21, 23, 29, 31, 32, 34, 36,37, 38                     |  |

Table 1

**QR-1 SUPPLIER QUALITY PROGRAM REQUIREMENT**

Conformance to the requirements of an AMC approved Quality System is required. An ISO 9000 quality system is recommended and is preferred. Although not required, third party registration is preferred.

**QR-2 SUPPLIER INSPECTION SYSTEM REQUIREMENT**

Conformance to the requirements of MIL-I-45208, Amendment 2, dated July 1981 is required. An ISO 9000 quality system is equivalent and is acceptable. Although not required, third party registration is preferred. The supplier's/subcontractor's program shall be subject to review and approval at all times by Arnold Magnetics Corporation and Arnold Magnetics Corporation's customers to verify the quality of work, review records, audit materials/processes or assist in problem solutions.

**QR-3 PURCHASE ORDER CONFORMANCE STATEMENT**

Each shipment shall be accompanied by one legible copy of a signed Supplier Certificate of Conformance or the Supplier's equivalent form with the same information which certifies that all requirements of the Arnold Magnetics Order have been complied with. The certificate shall identify the part number with revision quantity and the Arnold Magnetics Order number. The Supplier shall maintain records at his facility which will indicate that the material(s) conform to the drawing and/or specification requirements.

**QR-4 MERCURY CONTAMINATION EXCLUSION STATEMENT**

Materials delivered under this order shall include a statement reading substantially as follows: *"All components furnished on this order are free from mercury contamination and that no mercury bearing equipment was used in the manufacturing, fabrication, assembling, or testing of the deliverable product."* Each statement shall be signed and dated and shall list the number and Arnold Magnetics Order number; the statement shall be on Supplier's letterhead.

**QR-5 SUPPLIER'S CORRECTIVE ACTION SYSTEM**

Supplier shall provide a documented corrective action statement for returned discrepant items. Supplier shall state whether items were reworked or replaced, and if reworked, what rework was performed. Supplier's statement of corrective action must be returned with the shipment of any returned discrepant items. Additionally, the Supplier shall respond in a timely manner to each Arnold Magnetics issued Supplier Corrective Action Request.

**QR-6 SUPPLIER CONFIGURATION CONTROL**

The Supplier may not make changes to the technical documentation, specifications or drawings referenced by the Arnold Magnetics Order without prior approval by Arnold Magnetics. Proposed change definition shall be submitted to the Arnold Magnetics Buyer. The shipment of new configuration materials prior to Arnold Magnetics approval of the change is not permitted.

**QR-7 ARNOLD MAGNETICS QA VISITATION AUTHORITY**

Arnold Magnetics reserves the right to perform visits, inspection, and surveillance at the Supplier's facility to evaluate procurement compliance and/or corrective action implementation. This includes Arnold Magnetics Corporation customer and/or Government source inspectors. The Supplier shall make the facility and any relevant data available.

**QR-8 NONCONFORMING MATERIAL DISPOSITION**

Supplier shipment of nonconforming material without specific, prior approval by Arnold Magnetics is not permitted. A request for waiver shall be submitted to the Arnold Magnetics Buyer documenting the material condition. Previous disposition shall not be considered as a precedent for continued delivery of non-conforming material. Re-submittal of nonconforming material shall be identified either on the material or the shipping document(s) with reference to Arnold Magnetics' rejection document and evidence provided that the causes for rejection have been corrected.

**QR-9 OSHA SAFETY DATA SHEET**

Materials delivered under this order shall include an OSHA Material Safety Data Sheet with each shipment. Failure to provide this data can result in shipment rejection.

**QR-10 ARNOLD MAGNETICS SOURCE INSPECTION**

All items furnished under this order shall be verified and/or inspected by Arnold Magnetics at the Supplier's plant prior to shipment. Notify the Arnold Magnetics Quality Assurance Office ten (10) working days prior to shipment so that appropriate scheduling can be accomplished.

**QR-11 ACCEPTANCE TEST REPORTS**

One copy of the Supplier's Acceptance Test Data, identifiable to the material or items supplied, must accompany each shipment. Data shall provide objective evidence of compliance with all Acceptance Test requirements, as defined in applicable procurement documents. Failure to provide this data will result in Receiving Inspection processing delay.

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## QR-12 COMPONENT LEAD SOLDERABILITY

The Supplier shall provide material which meets component lead solderability requirements of ANSI/J-STD-002 Test A, B or C, as applicable. Defective material will be returned or reworked at Supplier expense.

## QR-13 RESISTANCE TO SOLVENTS

The Supplier shall be required to mark material in such a manner that the markings will remain legible and the product unaffected after completion of testing to the requirements of MIL-STD-202, Method 215. Permanency may be verified on Incoming material using sampling inspection methods. Rejected material will be returned or reworked at Supplier expense.

## QR-14 PHYSICAL AND CHEMICAL ANALYSIS REPORT

Material delivered against this order shall be accompanied by a detailed Chemical Analysis Report or Physical Test Analysis Report. *Accept/reject* criteria shall be based on commonly accepted industry standards unless otherwise specified on the face of the Arnold Magnetics Order.

## QR-15 LIMITED SHELF-LIFE MATERIALS

Materials or articles having a definite characteristic of quality degradation with age shall be marked in a manner to indicate the date at which the critical life was initiated and when the useful life will be expended. Seventy-five percent (75%) of shelf life for the batch should be remaining upon receipt at Arnold Magnetics. The Supplier's batch or lot number shall be provided with each shipment.

## QR-16 SUPPLIER DATA SHEETS

Supplier data sheets or catalog information, sufficiently definitive to provide proper identification of each order line item shall accompany the initial shipments against this order. Failure to provide this information can result in Receiving Inspection processing delays.

## QR-17 MICROCIRCUITS, HYBRIDS, SEMICONDUCTORS

Consistent with accepted industry practice, electronic parts or assemblies that are electrostatic discharge sensitive (ESDS) shall be suitably protected from static fields and discharges during all Supplier manufacturing processes, including item packaging and shipment. ESDS parts or assemblies not suitably protected when inspected by Arnold Magnetics shall be subject to rejection and return for replacement.

## QR-18 MEASURING AND TEST EQUIPMENT CALIBRATION

The Supplier shall meet and maintain a Calibration System in conformance with Calibration System Requirements of ISO 10012-1 or ANSI Z540-1. Although obsolete, a calibration system which meets the requirements of MIL-STD-45662 is also acceptable.

## QR-19 FIRST PIECE INSPECTION REPORT

A First Piece Inspection Report is a requirement of this order. The first acceptance part fabricated, pursuant to each line item of this order, shall be submitted to Arnold Magnetics along with a copy of the Supplier's First Piece Inspection Report. This report will include dimensional features (Supplier format); the inspected item(s) shall be tagged for verification by Arnold Magnetics Receiving Inspection. Determination of acceptability will be made at Arnold Magnetics and the Supplier will be notified in writing regarding problems detected during inspection. Items produced prior to Arnold Magnetics approval of the First Piece shall be at the Supplier's risk. Failure to provide this inspection report will result in Receiving Inspection processing delay.

## QR-20 INSPECTION DATA

One copy of Supplier's variables dimensional inspection acceptance data, identifiable to the material or items supplied, must accompany each shipment. Features inspection and reports shall reflect sound inspection practices, i.e. emphasis on major features, basic dimensions, datums and secondary operations, which are appropriate for the item supplied. Failure to provide this acceptance inspection data can result in Arnold Magnetics Receiving Inspection processing delay.

## QR-21 IDENTIFICATION

The Supplier shall identify all items in accordance with Arnold Magnetics Corporation drawings or as specified on the Purchase Order and/or in accordance with MIL-STD-130. Small parts, where size is prohibitive to physical marking, may be bag and tag identified.

## QR-22 PRINTED WIRING BOARD (PWB) REQUIREMENTS

The Supplier shall provide material which is manufactured and acceptable to the requirements of ANSI/IPC-A-600, Class 3 and the additional requirements defined by this clause:

- a. **Solder Mask.** Unless procurement drawings specifically state otherwise, PWB solder mask shall be in accordance with IPC-SM-840, Class 3 using materials which produce a semigloss finished surface when fully cured. The applied material may not be applied over or bleed onto circuit pads intended for subsequent solder application. Epoxy or dry film photopolymers are acceptable; masking coverage must be uniform and complete.
- b. **Conductor Plating.** Unless procurement drawings specifically state otherwise, each PWB conductor plating shall be solder plated (hot air solder level process). *Fused tin-lead plating is specifically prohibited.*
- c. **Solderability.** Each PWB shall meet the solderability requirements of ANSI/IPC-S-804.
- d. **Bow and Twist.** Each PWB shall meet the bow and twist requirements of IPC-A-600 (maximum bow and twist, 1.5%) for PTH and 0.75% for SMT when tested using IPC-TM-650 Test Methods.
- e. **Continuity-Internal Shorts Test.** Each PWB shall be tested for electrical integrity per IPC-A-600 Section 5.2. This testing includes both CONTINUITY and INTERNAL SHORT testing, as applicable for the PWB type.
- f. **Palletized PWBs.** PWB palletization will be invoked by specific procurement drawing part number that will define the dimensional features, i.e. quantity of PWBs per panel and tooling hole locations. Pallet break-away tabs shall use one of the following methods; Double Side Score (DSS) or Triple Hole Drilled (THD). All other tab break-away conventions require prior approval by Arnold Magnetics
- g. **Palletized PWB 'X-Out'.** When palletized PWBs are authorized, the Supplier may deliver pallets with defective PWBs provided the total defective PWBs on each individual pallet does NOT exceed one (1) and the shipping lot does NOT contain more than 5% total 'X-Out' PWBs. Defective PWBs MUST be clearly identified and grouped in the shipping lot.
- h. **Packaging.** Each PWB shall be packaged such that the PWB will not be damaged during transportation. *The packaging material selected shall not leave residual material on the PWB surface.*
- i. **Coupons and/or cross section.** Coupons shall be available and will be provided upon request.



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The above features will be verified on incoming material using sample inspection methods. Rejected material may be returned or reworked at Supplier expense.

**QR-23 MATERIAL CERTIFICATIONS/SPECIALTY METALS**

The supplier shall provide a minimum of one legible copy of any and all material certifications for materials used in the manufacture of purchased fabricated parts. The certification shall indicate at the minimum; the material composition, heat number and thickness, Also the cert must indicate the country of origin. AMC has a preference for metals and/or specialty metals that are smelted in the United States of America or a "qualifying country".

**QR-24 COUNTERFEIT PARTS/WORK**

- (a) SELLER shall have a counterfeit parts program that meets the intent of AS5553.
- (b) SELLER agrees and shall ensure that Counterfeit Parts/Work is not delivered to Arnold Magnetics Corporation.
- (c) SELLER shall only purchase products to be delivered or incorporated as Work to Arnold Magnetics directly from the Original Component Manufacturer (OCM)/Original Equipment Manufacturer (OEM), or through an OCM/OEM authorized distributor chain. Work shall not be acquired from independent distributors or brokers unless approved in advance in writing by Arnold Magnetics Corporation.

**QR-25 COMMERCIAL OFF THE SHELF ITEMS (COTS)**

The performance/functional and technical characteristics of the items being procured are described by the supplier's part number including product revision designation. Any change to performance/functional or mechanical characteristics requires notification to the Arnold Magnetics Buyer for determination of application impact prior to shipment.

**QR-26 ELECTRONIC ASSEMBLY WORKMANSHIP REQUIREMENTS**

- All items under the purchase order shall be manufactured in accordance with, and meet the requirements of, IPC-A-610 "Acceptability of Electronic Assemblies."
- A. Class 1 - General Electronic Products
  - B. Class 2 - Dedicated Service Electronic Products
  - C. Class 3 - High Performance Electronic Products

**QR-27 LEAD FREE FINISH**

Unless approved in writing by the buyer, no material delivered under this order may incorporate Lead (PB) – free tin finish or Lead (PB)-free solders. Lead (PB) - free is any tin based alloy that does not contain at least three percent (3%) Lead (PB) by weight. A C of C shall be provided stating that the Seller has verified that the Lot Date Code meets the requirements or Seller has verified by actual sample testing the material meets requirements.

**QR-28 ESD / EOS PREVENTION**

Supplier shall maintain an Electrostatic Discharge program for handling and protection of electrical / electronic parts, assemblies and equipment. The program shall be compliant with ANSI/ESD-S-20.20.

**QR-29 FLOW-DOWN**

-The supplier is required to flow down to sub-tier suppliers any applicable requirements in the purchasing documents, including key characteristics where required.

**QR-30 Conflict Minerals**

-AMC requires that all suppliers ensure that any materials supplied to Arnold Magnetics Corporation are in compliance to section 1502 of the Dodd-Frank Wall Street Reform and Consumer Protection Act section (HR.4173) with regard to "Conflict Free Minerals". A certificate certifying the material is "DRC" conflict-free is required.

**QR-31 Packaging & Shipping**

- The Supplier shall ensure that the supplied parts/materials are packaged using materials of a grade, size and weight which will provide adequate physical protection from damage and contamination during handling and transport to the point of delivery.
- All static sensitive components and assemblies furnished to Arnold Magnetics Corporation shall be packaged in such manner as to preclude damage due to static discharge. No foam peanuts are allowed.
  - Printed Circuit boards shall be individually packaged in a static protective bag and container. All packages shall be identifies with suitable (Electrostatic Discharge) ESD label.
  - Hazardous material shall be properly contained in accordance with health and safety requirements. The container shall be marked as to contents with appropriate warnings, precautions, instructions and storage conditions -MSDS required.

Each package or container shipped on this PO shall be marked with the length of useful shelf life and the date of expiration. Material must have at least 75% of its useful life remaining when shipped.

**QR-32 Special Processes**

-The Supplier shall ensure that any supplied parts/materials that are classed as,"Special Processes", certificates of conformance to the prescribed processes shall be submitted to AMC with the parts on delivery. Special processes are defined as: any part that is painted, plated, coated, welded, soldered, heat treated or annealed or other special processes as defined by the PO.

**QR-33 Solder per J-STD-001**

-The Supplier shall ensure that the supplied parts/materials are soldered in accordance to IPC-J-STD-001 Class 2 or Class 3 as specified by the the drawing and/or PO. A certificate of conformance attesting that that compliance is required.

**QR-34 ORDER OF PRECEDENCE**

In the event of any conflict between this document and other requirements the following order of precedence shall govern:

1. AMC PO
2. AMC Engineering Drawing/Parts List
3. This document



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### **QR-35 RoHS Compliance**

The supplier shall certify that materials supplied to AMC is RoHS Compliant.

### **QR-36 NADCAP Approved Process Sources**

The supplier shall utilize only NADCAP approved process supplier to accomplishing special processes. Any special processes that are used shall be documented on the supplier's or sub tier's C of C. The certification will be verified upon receipt of the hardware by AMC within the eAudit.net system to confirm the special processor was Nadcap certified, within the expiration date and within the scope of accreditation. This is required for each shipment.

### **QR-37 Approved Process Sources**

The supplier shall utilize only AMC/Customer approved special processors or as directed by AMC purchase order (PO). **The supplier shall obtain PO approval from the buyer prior to issuing PO to sub-tier supplier.**

### **QR-38 SUB-TIER FLOW-DOWN**

The seller shall flow-down all applicable AMC requirements to subcontractors and suppliers at every tier. The seller and associated sub-tiers shall ensure that persons are aware of:

- Their contribution to product or service conformity
- Their contribution to product safety
- The importance of ethical behavior.