SUPPLIER QUALITY ASSURANCE REQUIREMENTS

The following items, ***when specifically referenced in the purchase order by number***, form a part of the purchase order in addition to all other clauses, terms and conditions, and drawings and specifications, which are, made a part of the purchase order. Unless otherwise specified, specifications referenced herein shall be of the issue in effect on the date of request for quotation. Failure to comply with stated clauses will jeopardize acceptance of the shipment and invoice payment.
A negotiated partial acceptance or shared responsibility for a flowed down requirement may be considered by Aeroflex Control Components if a written deviation or waiver is completed and accepted by Aeroflex Control Components Engineering and Quality prior to signing a purchase order.

Q1) **INSPECTION SYSTEM** – The Seller shall provide and maintain an inspection system acceptable to the Buyer for all supplies and services covered by this purchase order. The inspection system shall be in accordance with ANSI/ASQC Z1.4 or equivalent. The Seller, in addition, shall establish and maintain a system which complies with ANSI/NCSLZ540, for the calibration of all measuring, and test equipment used in fulfillment of the purchase order requirements. The application of this requirement to the purchase order does not imply authorization for independent MRB action. Requests for use of non-conforming material must be made at each specific occurrence, and approval obtained from the Buyer's Quality Assurance Department.

Q2) **GOVERNMENT SOURCE INSPECTION** – "Government inspection is required prior to shipment from Seller's plant. Upon receipt of this order, Seller shall promptly notify and furnish a copy to the Government Representative normally servicing Seller's plant so that Government Inspection can be appropriately planned. If a Government Representative does not service a Seller's plant, Seller shall contact the cognizant Department of Defense Regulating Agency for direction. If Seller cannot locate the Government Office, Seller shall notify Buyer's Purchasing Agent immediately."

Q3) **BUYER SOURCE INSPECTION** – Source inspection by Buyer is required for all material covered by this purchase order prior to shipment from the Seller's plant. The Seller shall notify the Buyer's Quality Assurance

Department at least seven (7) days prior to the date material will be ready for inspection. Buyer may reject the material if non-conforming and require that full corrective action be completed prior to shipment.

Q4) **STANDARDS OF WORKMANSHIP -** The Seller shall provide and maintain written and thoroughly descriptive standard of workmanship directly applicable to the nature and level of work to be performed under this purchase order. A copy shall be furnished to the Buyer upon request. The Buyer may disapprove standards of workmanship considered inconsistent with the work to be performed and request correction of deficiencies. Standards of workmanship must satisfy all specifications applicable to the purchase order. The Buyer may impose his own standards of workmanship if the Seller is unable to comply with this requirement.

Q5) **GOVERNMENT ACCESS** – During performance of this order, Seller's Quality Control or Inspection System and Manufacturing processes are subject to review, verification, and analysis by authorized Government Representatives. Government inspection or release of product prior to shipment is not required unless Seller is otherwise notified. A copy of this order will be furnished to Seller's Government Representative upon request.

Q6) **SPECIAL PROCESS CONTROL** – Buyer approval of Seller's special processes, operating personnel, equipment and process procedures is required. Seller shall provide copies of procedures and personnel certifications upon request. If the Seller uses a facility other than his own, that facility is subject to the same conditions of Buyer approval. All certifications supplied as objective evidence must indicate the name and location of the facility performing each special process.

Q7) **CASTING REQUIREMENT** – Castings shall meet all applicable drawing requirements. An inspection report listing actual measurements of all cast dimensions must be supplied with the first article of the initial order. Test bars and material certifications representing each melt and heat shall be supplied with each shipment. All castings supplied shall not exceed applicable limitations of porosity, distortion, shifts, corrosion and shall meet dimensional requirements. Repairs shall not be made to defective items without prior approval from the Buyer's Quality Assurance Department.

Q8) **CERTIFIED WELDERS** – All fusion welding must be performed by welders certified in accordance with SAE AMSSTD-1595. Welders who may be certified to another welding specification may be used upon specific approval from the Buyer. Any alternate specification used must meet the minimum requirements of SAE AMS-STD-1595.

Q9) **MAGNETIC PARTICLE/PENETRANT INSPECTION** – Magnetic particle/penetrant inspection shall be performed in accordance with

applicable drawing requirements. Where specific requirements are not otherwise identified, the following specifications apply:

a) Penetrant inspection per ASTM-E-1417,
b) Magnetic particle inspection per ASTM-E-1444.

Personnel performing inspections shall be qualified in accordance with NAS-410. A report of the results of inspection shall accompany each lot shipped.

Q10) RADIOGRAPHIC INSPECTION – Radiographic inspection shall be performed in accordance with applicable drawing requirements. Where specific requirements are not otherwise identified, ASTM-E-1742 shall apply. The Seller shall furnish X-Ray film identifiable to each part, and two copies of the X-Ray laboratory report with each shipment.

Q11) TEST BARS – Two (2) test bars and material certification must be submitted with each shipment of castings for each melt and heat.

Q12) SHEAR SPECIMENS – The Seller shall furnish three (3) shear specimens in accordance with SAE-AMS-W-6858 for each lot of material on which resistance welding (Spot or Seam) is performed. Samples shall be prepared for each lot concurrently with the performance of welding. Welding machines shall be qualified to SAE-AMS-W-6858.

Q13) PRINTED CIRCUIT REQUIREMENTS – Multilayer printed wiring boards or other PWB's with plated through holes delivered against this purchase order, unless otherwise specified by the detail drawing, shall be accompanied by a micro-sectioned sample in accordance with IPC-TM-650 Method 2.1.1 from either the coupon specimen A or B of every panel produced in the lot.

- The coupon shall meet the requirements IPC-2221 and IPC-6011.
- Coupon specimens are to be thermally stressed and micro-sectioned only after final processing of the panel.
- Thermal stress testing shall be in accordance with IPC-TM-650 Method 2.6.8.
- A lab report is to be supplied indicating the panel number and circuits on the panel that the coupons represent.
- All the printed wiring boards delivered against this purchase order shall be capable of passing the structural integrity requirements specified in
  a) MIL-P-5110
  b) IPC-6013 Performance Specification for Flex Printed Boards
  c) IPC-6012 Performance Specification for Rigid Printed Boards

Q14) CURE/MOLDING/MFG DATE – The Seller shall furnish with each shipment made against this purchase order complete information in accordance with applicable military specifications, relative to the limited life of the material

supplied. Each unit package or container shall be marked. Rubber products, whether individually supplied or in assemblies, shall be identified as to cure or mold date. Containers of life-limited materials shall be marked with the date of manufacture and/or the expiration date. In no case shall material be supplied with more than 25% of its useful life expired.

Q15) **IDENTIFICATION/SERIALIZATION** – Each item delivered against this purchase order shall be identified by a unique part or type number. Control of individual items or lots shall be maintained by use of one or more of the following methods: date codes, lot numbers, serialization. Where individual items are furnished with inspection/test acceptance reports, each item shall be serialized and traceable to the data.

Q16) **CHEMICAL/PHYSICAL CERTIFICATION** – The Seller shall furnish certificates of physical tests and/or chemical analyses for material delivered against the purchase order. The heat, batch, melt number, etc., applicable to the material shall be included in the certificates.

Q17) **INSPECTION/TEST ACCEPTANCE REPORTS** – The Seller shall furnish inspection/test acceptance data for each specific part number delivered against this purchase order, indicating full conformance to all purchase order requirements and approved by Seller's Quality Assurance. Reports shall identify Buyer's purchase order number, Seller's name and location, item delivered, date codes or lot number or serial numbers, applicable drawings/specifications of inspection, parameters measured/tested with applicable limits and conditions, quantitative date recorded against each parameter, and a summary of results.

Q18) **CERTIFICATE OF TEST AND CONFORMANCE** -The Seller shall furnish, with each shipment against this purchase order, a certificate indicating full conformance to all purchase order requirements and approved by Seller's Quality Assurance. The certificate shall identify Buyer's purchase order number, Seller's name and location, item delivered, date codes or lot numbers or serial numbers, applicable drawings/specifications, date of inspection, test performed/parameters measured with applicable limits and conditions, total quantity submitted for tests, and the quantities accepted for shipment and rejected. The certificate shall further state that test reports and certifications for all material, parts, and processes used in manufacture are on file and available for examination.

Q19) **CERTIFICATE OF CONFORMANCE & COUNTERFEIT AVOIDANCE REQUIREMENTS** – The Seller shall furnish with each shipment against this purchase order a certificate indicating full conformance to all purchase

order requirements and approved by Seller's Quality Assurance. The certificate shall identify Buyer's purchase order number, Seller's name and location, item delivered, date codes or lot numbers or serial numbers, applicable drawings/specifications (including revisions) and quantity delivered. The certificate shall further state that test reports and certifications for all material, parts, and processes used in manufacture are on file and available for examination.

Manufacturers and suppliers including distributors shall provide written certification that all product being provided to Aeroflex Control Components to satisfy this Purchase Order contains only new product and the supplier has in their possession acquisition traceability documentation provided by the Original Equipment or Component Manufacturer and all previous distributors for all material contained in this shipment. Military compliant microcircuits and discrete semiconductors shall adhere to the acquisition traceability requirement in MIL-PRF-38535 and MIL-PRF-19500. These documents require that manufacturer certifications follow the parts throughout the supply chain. In no case shall the acquisition traceability documentation be altered or shows signs of alteration. This is grounds for immediate rejection of the lot/shipment. The original component manufacturer's certification shall include (at a minimum):

- Manufacturer's name and address
- Device type
- Lot identification code (including plant code)
- Conformance inspection acceptance date
- Quantity of devices in shipment from manufacturer
- Statement certifying product conformance and traceability
- Signature and date of transaction
- Customer or Distributors name and address

Other material should include the documentation cited above for military parts as available and applicable. At a minimum the supplier shall have documentation (for example, packing slips, invoices) that confirms acquisition traceability back to the device OEM/OCM.

- Acquisition traceability also includes distributor documentation for each distributor in the supply chain:
- Distributor's name and address
- Name and address of customer as involved in the chain of custody
- Quantity of devices in shipment
- Lot/Date code

Copies of acquisition traceability documentation must be maintained by the

supplier for a minimum of 5 (five) years.
The shipment record provided with each delivery of parts shall identify the Original Equipment Manufacturer (OEM)/ Original Component Manufacturer (OCM) CAGE code/ manufacturer identification, device part number and lot number/ date code if applicable. In addition each container shall be marked with the OEM/OCM identification, device part number and lot number/ date if applicable.

Counterfeit Avoidance Requirements –

Definitions
Unless defined in a document with a higher order of precedence than this Quality Note the following definitions shall apply herein:

a. "Counterfeit Item" is defined to include, but is not limited to, (i) an item that is an illegal or unauthorized copy or substitute of an Original Equipment Manufacturer ("OEM") or Original Component Manufacturer ("OCM") item; (ii) an item that does not contain the proper external or internal materials or components required by the OEM or OCM or that is not constructed in accordance with OEM or OCM design, but is represented as such; (iii) an item or component thereof that is used, refurbished or reclaimed but the Seller represents as being a new item; (iv) an item that has not successfully passed all OEM or OCM required testing, verification, screening and quality control but that Seller represents as having met or passed such requirements; or (v) an item with a label or other marking intended, or reasonably likely, to mislead a reasonable person into believing a non-OEM or OCM item is a genuine OEM or OCM item when it is not.

b. "Authorized Distributor" is defined as a distributor with which the OEM has a contractual agreement to stock, repackage, sell and distribute its product lines. Authorized Distributors normally offer the product for sale with full manufacturer flow-through warranty.

Seller's Risk Mitigation Seller shall maintain a Counterfeit Item risk mitigation process internally and with its suppliers using SAE AS5553 as a guide.

Seller shall immediately notify ACC if Seller becomes aware or suspects that items delivered in accordance with the ACC purchase order are or contain suspect or confirmed counterfeit items. When requested by ACC, Seller shall provide OCM/OEM documentation that authenticates traceability of the affected items to the applicable OCM/OEM.

Seller shall provide evidence of the Sellers risk mitigation process procedure to ACC upon request.

Seller shall purchase material directly from OEMs or OCMs or from Authorized Distributors of OEMs or OCMs and shall obtain approval from the ACC if items required to satisfy this order cannot be procured from these sources.

Seller shall present complete and compelling support for any request to procure from sources other than OEMs or OCMs or their Authorized Distributors and include in the request all actions completed to ensure the parts thus procured are not Counterfeit Items. The Seller‘s supporting documentation shall also include:

- Results of authentication test and analysis conducted. (using AS5553 as a guide)
- Traceability with identification of all supply chain intermediaries wherever such traceability exists.
- Identification of and traceability to the source for any remarked or resurfaced material.

Seller is not authorized to deliver any item procured from sources other than OEMs or OCMs, or their Authorized Distributors without prior written authorization from ACC.

- The seller shall segregate and provide traceability identifiers (i.e. Date Code / Lot Code., Serial number) for all items delivered to ACC which contain an item procured from sources other than OEM’s or OCM’s or their Authorized Distributors.

Seller shall flow down to, and ensure compliance with the requirements of this Q-Note to suppliers providing items for delivery to ACC.

Q20) **QUALIFICATION DATE** – For each item on the purchase order, the Seller shall furnish with the first shipment against this purchase order, a copy of the latest completed lot evaluation performed on any device within the same family of devices. The Buyer may disapprove data considered not relevant to current production, or to the device supplied.

Q21) Each **IC** shall be visually inspected to assure conformance with the applicable die related requirements of MIL-STD-883, Method 2010. Semiconductor die shall be visually inspected in accordance with MIL-STD-750, Method 2072 or 2073 as applicable: a) Class H (B), b) Class K (S).

Q22) Each **die** shall be electrically tested which may be done at the wafer level provided all failures are identified and removed from the lot when the dice are separated from the wafer. The minimum requirements shall include static testing at 25°C (per MIL-PRF-38534 Group A Subgroup 1 for Microcircuits and MIL-PRF-19500 Group A, Subgroup 2 for Semiconductors).

Q23) Each **passive element** shall be visually inspected in accordance with MIL-STD-883 Method 2032:
a) Class H
b) Class K.

Q24) **Passive elements** shall be 100% electrically tested at 25°C in accordance with the element acquisition document. Attributes summary data shall be provided.

Q25) **Lids** shall be evaluated in accordance with the Package Evaluation requirements of MIL-PRF-38534.
Attributes summary data shall be provided.

Q26) **Cases** shall be evaluated in accordance with the Class K requirements of MIL-PRF-38534, Package Evaluation paragraph C.3.8, Table C-VI with the addition of Temperature Aging Testing as specified in paragraph C.6.3.2.6 and defined below, prior to solderability requirements and Integral Substrate/Package Evaluation C.3.9, Table C-VII as applicable.

Packages shall be baked per MIL-PRF-38534, paragraph C.3.9.7 when required per the detail drawing.
Attributes summary data shall be provided.
a) Temperature Aging not performed;
b) Three (3) non-tested samples provided;
c) Temperature aging performed and the three (3) samples provided.

Q27) **Calibration** shall be in accordance with: a) with ANSI/NCSLZ540 (Latest Revision) or b) ANSI/NCSL Z540-1, American National Standard for Calibration, Calibration Laboratories and Measuring and Test Equipment, General Requirements and ISO10012-1, Quality Assurance Requirements for measuring Equipment (Latest Revision).

Q28) **Polymeric Adhesives** shall have been evaluated and accepted per MIL-STD-883 Method 5011 for: a) Type I-electrically Conductive, b) Type II-electrically insulative unless otherwise specified by the adhesives' detail drawing (SCD). A Certificate of Compliance shall be provided for each adhesive order and shall contain the actual test data for the suppliers testing as prescribed in Method 5011 or MIL-STD-883. (Effective date –May 29, 1988).

Q29) **NOTIFICATION OF CHANGE** – The seller/supplier of material on this purchase order/contract shall not make any changes to the material in the design, manufacturing processes and construction. This includes location change of the manufacturing facility and location change of production lines or significant process equipment within the facility. This shall include any Class 1 change that would affect performance, quality, reliability, or interchangeability of the material to be delivered. Notification of the change must be made prior to shipment of the material and be approved by Aeroflex Control Components Quality Assurance Department in writing to the seller/supplier of the material. Aeroflex Control Components must be notified when the seller/supplier changes their (lower level) suppliers.

Q30) **PACKAGING OF MATERIAL** – a) Best commercial practices shall be used by the supplier when shipping to prevent damage, deterioration, or degradation of the material, b) Electrostatic sensitive devices/material must be packaged in antistatic materials or containers, consistent with the electrostatic discharge sensitivity range as described in DOD-HDBK263 & DOD-STD-1686. All packaging shall be clearly labeled as to ESD warning or caution as required as per MILSTD-129, c) All components shall be packaged in **conductive** materials or containers consistent with the electrostatic discharge sensitivity range as described in DOD-HDBK-263 and ANSI/ESD S20.20. All packaging shall be clearly labeled as to ESD warning or caution as required per MIL-STD-129. All components shall be protected from static damage by the supplier during processing, packaging and shipment in accordance with ANSI/ESD S20.20, d) All parts shall be free of contaminants and packaged in a manner to prevent packaging residue from contaminating the parts, e) Each individual container shall be marked with its –40°C storage expiration date, if applicable**.**

Q31) **MIL-STD-1535, SUPPLIER QUALITY ASSURANCE PROGRAM REQUIREMENTS** – a) This is a Group I Procurement in accordance with MIL-STD-1535 (Latest Revision), b) This is a Group II Procurement in accordance with MIL-STD-1535 (Latest Revision), c) This is a Group III Procurement in accordance with MIL-STD-1535 (Latest Revision), d) This part has been designated as a Registered Component as per MIL-STD-1535 (Latest Revision)

Q32) <u>SOLDERABILITY REQUIREMENTS</u> – All devices and/or material supplies shall meet as applicable the following requirements:

a) MIL-STD-202 Method 208 for other parts not covered by item (b) to item (f),

b) MIL-STD-750 Method 2026 for semiconductors,

c) MIL-STD-883 Method 2003 for microelectronics,

d) J-STD-003, Category 2 for Rigid Printed Circuit Boards

e) MIL-P-50884 Paragraph 3.4.6 for Flexible and Rigid Flex Printed Circuit Boards,

f) IPC-S-804 Solderability Test Methods for Printed Wiring Boards,

g) J-STD-002 for Electronic / Mechanical Components and Wires.

h) J-STD-001E Requirements for solder and solderability of electronic assemblies.

i) IPC-610E Acceptability of electronic assemblies

Q33) <u>MOISTURE RESISTANCE TEST</u> – Moisture resistance performed per MIL-STD-883 Method 1004 shall include performance of insulation resistance as specified in Method 1004. Evidence of this shall be included on the Certificate of Compliance.

Q34) As applicable per **<u>OSHA</u>** <u>requirements</u> of 29 CFR 1910.1200, the supplier of this material shall furnish a material safety data sheet with the first shipment against this purchase order, on any shipments against this order occurring more than a year from supplying the last material safety data sheet, or upon any change in the material safety data sheet.

Q35) <u>ELEMENT EVALUATION TESTING – Class K</u> – a) The Seller/Supplier of material on this purchase order/contract shall furnish an Element Evaluation Test Report in accordance with the Class K Element Evaluation requirements of MILPRF-38534, b) The Seller/Supplier shall furnish Aeroflex Control Components with samples for Class K element evaluation.

Q36) <u>SEM Analysis – Class K</u> – SEM Analysis (Scanning Electron Microscope) shall be performed per MIL-STD-883 Method 2018 unless otherwise specified. The seller/supplier of material on this purchase order/contract shall furnish Class K SEM Analysis data including SEM certificate of compliance and photographs.

Q37) <u>RADIATION TESTING – Class K</u> – a) Radiation testing to be performed to MIL-STD-883, Method 1017, Method 1019, and Method 1020 unless otherwise specified. The Seller/Supplier of material on this purchase order/contract shall furnish Class K Rad certificate of compliance and data to Aeroflex Control Components, b) The Seller/Supplier shall furnish Aeroflex Control Components with Class K Radiation Testing samples.

Q38) SOFTWARE QUALITY ASSURANCE – Supplier must use ISO 9000-3 as a guide for any new development of software or major software change. Software includes

(1) Software delivered to Aeroflex Control Components

(2) Software used to determine final acceptability of parts delivered to Aeroflex Control Components

(3) Software used to control the manufacturing and production process of parts delivered to Aeroflex Control Components

Major software change is defined as any effort that results in 20% or more of the code being changed. A SQAPP (Software Quality Assurance Program Plan) is not required as a deliverable data item; however, supplier is required to have documented procedures for development and change of software with records maintained and available upon request.

Q39) QUALITY SYSTEM – The Supplier shall maintain a Quality System in accordance with ISO 9001 or AS9100 or an equivalent system acceptable to the buyer for all supplies and services covered by this purchase order.

Q40) CLASS K MANUFACTURER LOT REQUIREMENT – The Supplier shall furnish with each shipment made against this purchase order traceability of manufacturer diffusion lot including wafer number on the Certificate of Compliance.

Q41) BUYER SOURCE INSPECTION – *PRECAP* – Source Inspection by Buyer is required for all material covered by this purchase order prior to sealing of the material. The Seller shall notify the Buyer's Quality Assurance Department; at least seven (7) days prior to the date material will be ready for inspection. Buyer may reject the material if non-conforming and require that full corrective action be completed.

Q45) Objective evidence of **Cleanfire** at 1350 to 1375°C for 1 hour minimum is required with each shipment of laser machined or BeO substrates.

Q46) All suppliers of **rigid printed boards** shall be qualified manufacturers and the boards shall be selected from the Qualified products List (QPL) for MIL-P-55110 or from the Qualified Manufacturers List (QML) for MIL-PRF-31032. Additionally, only those suppliers qualified for the laminate materials as specified on the PWB Master Drawing shall supply to this order.

Q47) All **rigid printed boards** applicable to all NASA Goddard Space Flight Center (GSFC) programs and contracts shall be in accordance with GSFC

specification S312-P-003 requirements.

Q48) **PROHIBITED MATERIALS** –The supplier shall provide a Certificate of Compliance, when requested, specifically attesting that products intended for Space and Military applications do not contain materials that are banned from such applications by local, state or federal law.

Q49) **TRANSMITTING DATA** – When any kind of objective evidence or certification or test is required by this P.O., the data shall be transmitted electronically (i.e. Adobe Acrobat (.PDF), etc.) by Internet, e-mail or physically in disk or CD media. The media shall be identified with the purchase order, part number and line item. This includes, but not limited to: inspection/test acceptance reports, chemical/physical certifications, attribute summary, etc. Contact the buyer for name, number or e-mail of the Incoming Inspector. Since incoming inspection must verify that the data is present upon receipt, it is imperative that the data be supplied punctually.

Q50) OBSOLETE REQUIREMENTS – This purchase order flows down obsolete requirements (i.e. MIL-I & MIL-Q, MILSTD's, etc.) because these requirements are specified for the end item. The supplier shall abide by these requirements to the extent necessary to assure the necessary quality and reliability.

Q51) **SMALL FACILITY QUALITY SYSTEMS** – The supplier shall maintain a quality system that best provides for compliance to the requirements of this purchase order, commensurate with the scope and complexity of the work or service to be performed, relative to the size and limitations of the facility.

Q52) **WITNESS SAMPLES FOR CONFORMAL COATING – PAINT PROCESSES, CHEMICAL CONVERSION PROCESSES AND OTHER SURFACE TREATMENTS & FINISHES** – The supplier performing this service shall perform the following actions and then deliver the requested data and samples indicating full compliance to the process performed as applicable. a) A record of each mix batch date or lot of material and procedure number and the revision used utilized shall be furnished as part of the shipment of the completed finishing process. b) Two (2) witness samples shall be maintained for each mix batch or lot of material unless otherwise specified in the Aeroflex Control Components Purchase Order. The size and material type of the sample must be the same as the item having the conformal coating, paint process, chemical conversion processes and other surface treatments & finishes. These samples shall be processed at the same time and under the same conditions as the item(s) being finished. These witness samples shall be packaged separately and delivered with the items processed.

Q53) <u>SINGLE LOT/DATE/OR BATCH CODE</u> – Items supplied on this purchase order shall be from a single lot, date or batch code (single element) as defined being manufactured at the same time form the same homogeneous lot of material, parts, components and/or elements.

Q54) <u>FIRST ARTICLE INSPECTION REPORT</u> is required on this purchase order. The following requirements called out by "letter" on the P.O. are required to be performed, listed and delivered with the item being supplied on this purchase order in hard copy or electronic media (disc/CD-ROM) in Microsoft Word, Excel Format and/or CMM format. It is suggested to use AS9102 as a guide. a) Aeroflex Control Components Purchase Order b) Aeroflex Control Components Purchase Order Line Item Number (In the event of Multiple Line Items/Part Numbers) c) Inspection Signature/Stamp d) Aeroflex Control Components Drawing Number and Revision e) **100% Read and Record** Dimension Values of the Aeroflex Control Components Drawing obtained during the supplier inspection. This shall reference Aeroflex Control Components Drawing Zone for the characteristic to be measured, the actual dimensional requirement stated on the drawing, tolerances and all drawing notes. f) Material Chemical/Physical Certifications from the original supplier of the material used to manufacture the specific part number (i.e. aluminum, steel, titanium, etc.) g) Material Finishing Certifications (Plating, Coating, Painting) specifically citing the specification and procedure required to perform the process. h) Assembly parts list with individual piece parts and Drawing Revision Levels. Date/Lot/Batch Code of each part contained therein (applicable to Assemblies Only).

Q55) <u>SUBCONTRACTED SERVICES CERTIFICATE OF COMPLIANCE (SOURCE OF ORIGIN)</u> -The supplier of the item being procured by Aeroflex Control Components shall deliver a copy of the original manufacturer's certificate of compliance for any an all processes performed in the manufacturing of this item. This pertains to but is not limited to processes such as heat treating, welding brazing, painting, plating, finishing, conformal coating, machining, micro-sectioning, outside services, etc.

Q56) <u>APPROVED SOURCES</u> -The supplier for items on this purchase order must contact the Aeroflex Control Components Purchasing Department to obtain a listing of approved sources that are part of a mandatory flow down from the prime contractor. If sources other than listed are utilized, the items supplied shall be deemed as non-compliant to the purchase order requirements and shall not be accepted by Aeroflex Control Components for its usage.

Q57) <u>RETENTION OF RECORDS</u> -Inspection and/or test records of the supplier submitting parts proving compliance to all of the Aeroflex Control

Components purchase order, drawing, and statement of work and/or specifications shall be actively maintained for a period of **seven (7) years** for the purposes of data review upon request by Aeroflex Control Components unless otherwise stated in the purchase order.

Q58) <u>OBSOLESCENCE/END OF LIFE</u> – The supplier of the product, material, component, process, circuit or other items deliverable on this purchase order shall notify Aeroflex Control Components Purchasing Department if one or any combinations of the following conditions exist: a) Product, material, component, process, circuit or other items deliverable are known to have Obsolescence or End of Life Issues. b) The product, material, component, process, circuit or other items deliverable are currently no longer in production. c)Product, material, component, process, circuit or other items deliverable are nearing the end of their life cycle and are to be discontinued from manufacturing/processing within the next five (5) years. d) Product, material, component, process, circuit or other items that **Do Not** have Obsolescence/End of Life issues and will be deliverable and will be available for the next five (5) years. This notification to Aeroflex Control Components Purchasing Department shall be performed once on the execution of this purchase order with the following provisions: If the purchase order delivery cycle/schedule requires more than a twelve (12) month performance period, then the supplier/vendor shall notify the Aeroflex Control Components Purchasing department as a minimum every twelve (12) months of this delivery cycle/schedule for part Obsolescence/End of Life issues. In addition, supplier shall provide options and recommendations regarding the Obsolescence/End f Life conditions noted and notify Aeroflex Control Components Purchasing Department. Resolution of Obsolescence/End of Life issues may include a one time purchase of all End of Life items or the Qualification of an alternate supplier item or change/redesign of the product, material, component, process, circuit or other items deliverable on this purchase order.

Q59) <u>SUBCONTRACTED SERVICES</u> -Vendors that provide sub-contracted services (i.e. lead forming, tinning, printed wiring board assembly, marking, etc.) shall provide a quality program plan that describes how the vendor's quality organization plans to control the product for this specific purchase order or program. The program plan shall be based on the quality system specified by the PO, the source control drawing and/or statement of work.

Q60)<u>HYBRID MANUFACTURE</u> -Vendors are required to provide the documentation described below when material is validated through a supplier certification system or required as par of a MIL-PRF38534 Qualified Manufacturer Listing: (i.e. ARX-003 for Cirtek Electronics) a) A description of

the vendor quality assurance plan with status update reports as required by the TRB or QA. b) A description of the procedure used by the vendor for notification of changes in materials or processes. c) A quality assurance procedure that can be performed by either the vendor or the manufacturer or a combination of both.

Q61) IM&TE -Inspection, Measurement and Test Equipment shall be calibrated per Purchase Order requirements. Upon receipt, contact Calibration Department that new equipment has been received and then deliver for processing.

Q62) PREFERENCE FOR DOMESTIC SPECIALITY METALS -Domestic Specialty Metals are applicable on this order. Any specialty metals used in any deliverable products must be melted in the United States or a qualifying country. Refer to DFARS 252.225-7003, DFAS 252.225-7008 and DFAS 252.225-7009 for the definitions of specialty metals and the listings of qualifying countries.

Q63) SAMPLES INSPECTION/TEST REPORT – DEFINED SELLER PERFORMANCE/ACTION: One (1) line item/part of the specific part number shall have 100% of the inspection, parameters measured/tested with applicable limits and conditions, quantitative data recorded against each parameter. The balance of the line item/part quantity of the specific part number shall have a sample inspection performed per ANSI Z 1.4, Normal Sample, Level II, 1 % AQL on the critical dimensions/parameters as defined by the Aeroflex drawing and/or specification. The inspection, parameters measured/tested with applicable limits and conditions, quantitative date recorded against each parameter, and a summary of results shall be noted. The above actions do not relieve the supplier with the full compliance to the drawing, specification & P.O. requirements.

Q64) Nonconforming Material: Delivered material must conform to all drawing, specification, workmanship and flow down requirements specified by the purchase order. Acceptance of material by Aeroflex Control Components at the supplier's facility or at destination does not constitute a waiver if the material is subsequently determined to be nonconforming. Exceptions are not permitted unless written contractual authorization is received from the Aeroflex Control Components buyer with Quality Assurance approval. Authorization to deliver nonconforming material shall be limited to the purchase order, line item(s), part number(s) quantity and nonconformance as contractually permitted.

Q65) GIDEP Notification: For a period of 10 years after date of last shipment, the supplier is required to notify the buyer within forty-eight (48) hours of

previously delivered material that is discovered to be nonconforming or is the subject of a released Government-Industry Data Exchange Program (GIDEP) Alert or Problem Advisory.

Q66) **Red Plague Mitigation**: Silver coated copper wire can become corroded with cuprous oxide ("red plague") when moisture is absorbed and penetrates through pinholes or other breaks in the silver plating and invades the silver-copper interface. Therefore, the methods used to produce, store and use silver plated wire shall be controlled as described below. Wire manufacturers and distributors shall provide methods and processes for the control, transportation, and storage to mitigate the formation of "red plague". These controls should also include testing of wire (conductor only) for red plague susceptibility in accordance with ECSS Q70-20 for the lot to be supplied. The results of the testing shall be provided and so noted on the C of C.

1) Wire manufacturing controls shall:

a. provide traceability to the plating batch for each lot of wire.

b. have environmental controls to provide dry processing of insulation and dry electric testing to prevent introduction of moisture inside the insulation.

c. ensure that the wire ends are protected to prevent the diffusion of air and water vapor into the wire. The preferred protection method includes placing the wire in a heat sealed, moisture inhibiting plastic bag with appropriate quantity of desiccant.

d. prohibit quenching with water. Only oil, dry processing, and sealing sha11 be used.

e. note that conformance with the above controls is certified on the C of C provided. In the event that item "e" above cannot be obtained from the wire manufacturer, a six-foot sample from each end of the wire shall be cross-sectioned and a metallographic inspection performed for the presence of cuprous oxide BY THE SUPPLIER.

2) Cable Harness Assembly Controls

a. The cable harness fabricator shall conduct the assembly process in a controlled environment. The temperature and humidity on the controlled environment shall be monitored, documented, and maintained within the limits defined below:

i. Temperature: 68 -85°F

ii. Humidity: 70% maximum

b. If at any time the dew point is reached, the fabricator shall halt the assembly process and immediately relocate the cable harness to dry environment to avoid damage to the hardware.

c. Before harness fabrication, the fabricator shall perform a visual inspection of the wire for pit, voids, cracks, evidence of red plaque, or other defects.
d. The fabricator shall minimize the exposure of the silver plating by ensuring the insulation remains on the wire until assembly.
e. The fabricator and subsequent handling personnel shall ensure the bend radius of two (2) cable diameters is not exceeded.
f. Completed cable harnesses shall be placed in a non-opaque, heat-sealed, plastic bag with the appropriate amount of desiccant, a humidity indicator clearly visible, and stored in a controlled environment where the dew point is not attained.
g. The fabricator shall not use aqueous solvent for flux removal or any other operation that subjects silver-plated wire to an aqueous solution. Only non-aqueous solvent are allowed.

Q67) **Wire and Cable Certification:** Wire shall be certified through testing by a suitably qualified lab. NASA Approved test facility may be used.

1) Certification Testing

2) 100-Percent Testing
   a. Insulated single conductor wires and cable basic wires
   b. Impulse dielectric test (no greater than 80% of military specification)
   c. Testing for insulation flaws of cable's basic wires shall be done prior to cable assembly.
   d. Dielectric withstand of component wires
   e. Jacket flaws for shielded cables

3) Sample Testing:

As a minimum, a sample or samples of each lot of wire/cable shall be subjected to the following quality conformance inspections (as applicable in accordance with the wire or cable specification).

i. Insulated single-conductor wires and cable basic wires

a. Conductor resistance
b. Wrap test
c. Shrinkage (heat resistance)
d. Cold bend followed by wet dielectric
e. Visual and mechanical examination (finished wire outer diameter, identification of product, conductor diameter, strand diameter, conductor stranding, wire base metal, and plating material)
f. Polyimide cure test (for modified aromatic polyimide coatings

only)
g. Crosslink proof testing (for cross-linked insulation materials)

ii. Cable

a. Shield coverage
b. Identification of product
c. Jacket wall thickness
d. Cold bend
e. Thermal shock
f. Stress-crack resistance testing (MIL-C-17 Cable only)

Objective evidence of total conformance shall be provided by the supplier in the form of a screening traveler or by noting successful completion of the tests listed above on the certificate of conformance.

Q68) Franchised Distributor Change Notification Requirement (applies to Franchised Distributors only): All changed to the distributors OEM/OCM franchise status must be reported to the Aeroflex Control Components Buyer within 7 days. Change status includes but is not limited to, the following examples:

a. Loss of OEM/OCM Franchise in total or limited to certain products or product lines.
b. Additions of new OEM/OCM Franchise Authorizations.

Q69) Right of Access

During the performance of this Purchase Order by the supplier,. Aeroflex Control Components and its customer reserve the right to visit the supplier's facility, with sufficient notification of this intent, for the purpose of verifying that processes are being performed as specified on the traveler, drawing(s), etc.., as well as reviewing training records of personnel involved in the manufacture, testing and inspection of Aeroflex Control Components' products.

Q70) ESD Packaging Requirement

All ESD sensitive products shall be packaged using ESD protective packaging. Any ESD sensitive product received without proper ESD packaging will be rejected by Aeroflex Control Components' Incoming Inspection and returned to the supplier as discrepant material.

Q71) Pure Tin Prohibition –

The uses of Pure Tin Plated finishes are strictly PROHIBITED. Any Tin Plating or Tin Solder processes shall contain NO LESS than 3 percent LEAD composition, unless specifically authorized in writing by ACC. These restrictions apply for all

types and levels of procurements, with the supplier responsible for communicating these restrictions to subcontractors or sub-tier suppliers as required.

EXEMPTION: If an ACC Technical Data Package or design drawing on this order specifies the use of pure tin finishes this prohibition is NOT applicable. If ACC specifies a Seller Part Number which contains pure tin, then the purchase order must specifically authorize the use of pure tin for the specified part number(s).

NOTE: Tin -plated finishes may be used if: (a) the seller has a written tin control plan in accordance with GEIA-STD-0005-2 that has been approved in writing by ACC, and (b) the tin usage conforms with requirements of the plan. Lead-free solder processes may be used if: (a) the seller has a written Lead-Free control plan in accordance with GEIA-STD-0005-1 that has been approved in writing by ACC, and (b) the lead-free solder usage conforms to the requirements of the plan.

Q72) <u>Foreign Object Damage (FOD) Prevention</u> –

The Seller shall establish and maintain an effective Foreign Object Damage (FOD) Prevention Program to reduce FOD.

The Seller's program shall utilize effective FOD prevention practices. The program shall be proportional to the sensitivity of the design of the product(s) to FOD, as well as, to the FOD generating potential of the manufacturing methods.

The written procedure or polices developed by the Seller shall be subject to review and audit by the Buyer and/or government representative, and disapproval when the Seller's procedures or policies do not accomplish their objectives.