Supplier Quality Clause Program

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Change History

Effective Date	Revision	Created By	Description of Change
6/3/2024	A	Rich Welch	Initial release.
1/30/2025	B	Tracy Jones/ Rich Welch	Added AS6174 reference to QCCs 102 and 326. Added missing verbiage to QCC324 related to paint requirements. Deleted revisions from external specifications and standards throughout. In section 1.3 for Supplier, added third bullet directing the use of the latest revision unless specified otherwise. Added MIL-DTI-5541 to section 3.

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1. Purpose, Scope, and Users

1.1 Purpose

The purpose of this program is to identify and explain Quality Clause Code (QCC) flown down to suppliers and subcontractors, herein known as "the supplier," through purchase orders (POs) and subcontracts issued by CFD Research Corporation, herein known as "the organization."

1.2 Scope

This program applies to all organizational sites and establishes a common language with suppliers of products, processes, and services related to POs and subcontracts, herein known as "orders," initiated by the organization. When exceptions are allowed, each are noted within that QCC.

1.3 Users

Quality Representative works for operations and has the following responsibilities:

- Develops and maintains QCC.
- Works with purchasing and subcontracts to determine the QCCS to flow down.
- Ensures QCCs are flown down via orders and adhered to.

Purchasing Agent works for procurement of materials or services and has the following responsibilities:

- Verifies applicable QCCs are noted on the order.
- Works with Quality to ensure each QCC is understood, flown down, and adhered to.

Contracting Agent works for Contracts of services via subcontracts or consultants and has the following responsibilities:

- Verifies applicable QCCs are noted on the order.
- Works with Quality to ensure each QCC is understood, flown down, and adhered to.

Supplier provides a product, service, or process and has the following responsibilities:

- Reviews flown down QCC and ensures compliance to these requirements.
- In the event of a conflict, the supplier shall contact the organization's respective agent and Quality representative to resolve prior to initiating work.
- Shall use the latest revision, unless specified within the order, of any flown down standard and specification such as MIL-DTL-5541, AS6174, and the like.

It is best practice to place a uniform resource locator (URL) onto the organization's website and within the order, so this program is accessible by suppliers, subcontractors, and customers.

2. Procedure

When product, processes, and services are needed to complete work on a contract for the organization and its interested parties, Quality, Purchasing, and Subcontracts shall ensure all applicable QCCs are noted within the order, and provides a link to the organization's *General Terms and Conditions (T&Cs)* and this program document.

Quality Clause Structure

QCCs are categorized as series such as 100, 200, and 300, and the applicable series clause shall be noted on all production orders. Therefore, when a supplier accepts the order, each are expected to comply with the required QCC. In the event a supplier cannot meet or finds a QCC not applicable, its representative must contact the organization's respective agent and Quality representative for clarification. In the event there is a conflict between QCCs, the higher number takes precedence.

Series 100 Quality Clauses

QCC100 – Quality Management System (QMS): The supplier shall maintain a QMS compliant with AS9100D and ISO9001, or one that is certified by an accredited registrar. The supplier must immediately notify the organization's respective agent and Quality representative of any change impacting the QMS, such as certification status, site relocation, onsite changes, Quality Manager, etc.

The supplier shall ensure persons doing work under its control are aware of their contribution to product safety, product or service conformity, and ethical behavior. The supplier shall determine the requirements for products and services including consideration of personal and product safety. Refer to the organization's *General T&Cs* for additional information.

The supplier shall plan, implement, and control the processes needed to assure product quality and product safety during the product's lifecycle, as appropriate to the organization and the product to include processes as follows:

- assessment of hazards and management of associated risks,
- management of critical safety items,
- analysis and reporting of occurred events affecting safety, and
- communication of these events and training of persons.

QCC101 – Handling, Shipping, Packaging, Preservation, and Identification (HSPPD): Unless otherwise directed via the order, all products shall have packaging and packing that align with the below listed requirements. For example, all electrostatic discharge sensitive (ESDS) items shall be packaged in an approved electrostatic discharge (ESD) packaging with proper labeling.

- *ASTM D 3951-10, Standard practice for commercial packaging for immediate use items.*
- *MIL-STD-2073-1, Military Preservation with Military Packing Level A.* For items entering the military distribution system (includes any storage at a DOD facility for subsequent destinations), Overseas Continental United States (O-CONUS) surface shipments.
- *MIL-STD-2073-1, Military Preservation with Military Packing Level B.* For items entering the military distribution system (includes any storage at a DOD facility for subsequent destinations), O-CONUS air (APO/FPO), O-CONUS freight forwarder, or CONUS domestic shipments.
- Military Distribution System Exposure. For items or systems categorized as special or selective using MIL-STD-2073-1 criteria, transportation validation shall be evaluated at a minimum for vibration per MIL-STD-810, Method 514, Category 4 for all three-axis and mechanical shock per MIL-STD-648 for free-fall drop and impact.

Each pack slip shall include information as follows:

- Part number and revision
- Order number
- Order line item
- Quantity
- Supplier identification to include its Commercial and Government Entity (CAGE) code

When required, all above information shall be human and machine readable.

QCC102 – Source of Supply: Suppliers are responsible to ensure compliance for materials used to manufacture parts supplied the organization. Suppliers will only purchase materials from Original Equipment Manufacturers (OEMs), Original Component Manufacturers (OCMs), and the OEM and OCM authorized distributors. Purchasing from independent brokers or other sources is unauthorized unless approval is received in writing.

Suppliers of electronic components shall have an established counterfeit avoidance program compliant to *AS5553, Counterfeit Electronic Parts; Avoidance, Detection, Mitigation, and Disposition, AS6174, Counterfeit Materiel; Assuring Acquisition of Authentic and Conforming Materiel,* and *AS6081 Fraudulent/Counterfeit Electronic Parts: Avoidance, Detection, Mitigation, and Disposition – Distributors*. Distributors of electronic components shall certify franchise agreements and/or written OEM and OCM supplier authorization is on file for all provided product.

For broker product: If product cannot be procured from the OCM, or the OCM's Authorized distributors, organizational approved distributors may be used upon written approval. The supplier must present a complete test plan for each procured product per AS6081. The test plan shall ensure procured product is functional and a new, authentic parts. The test plan must be approved by the organization and referenced on the order. Test results must be retained by the supplier and made available upon request. Approved distributors must be AS6081 compliant. Supplier shall notify the organization immediately upon suspecting or identifying a product to be counterfeit. Notification of counterfeit or suspect counterfeit components shall be performed using the approved process noted in the organization's *Prevention of Counterfeit Product Process*. The supplier shall not deliver products containing counterfeit, or suspect counterfeit, product to include but not limited to software, material, and electrical, electromechanical, and mechanical product.

Any suspect counterfeit parts delivered to the organization are considered nonconforming material and will be controlled per *Prevention of Counterfeit Product Process* and *Control of Nonconforming Products Process*. Counterfeit parts will not be returned to the supplier and will be reported to Government-Industry Data Exchange Program (GIDEP).

QCC103 – Monitoring and Measuring Equipment: The supplier has the responsibility to ensure all equipment including customer-furnished equipment (CFE), and government-furnished equipment (GFE) used to inspect and test any supplied product are maintained and traceable to National Institute of Standards and Technology (NIST) requirements.

The supplier shall ensure calibration is carried out per one or more of the following or equivalent:

- *ISO 10012:2003 Measurement management systems – Requirements for measurement processes and measuring equipment*
- *ISO/IEC 17025, General requirements for the competence of testing and calibration laboratories*
- *ANSI Z540.3, Calibration Laboratories and Measuring and Test Equipment – General Requirements*, or equivalent.

QCC104 – Control of Quality Records: All records related to manufacturing, testing, and inspecting product supplied to the organization's order shall be retained for a period of Length of Contract plus 1 year from delivery and final payment, unless otherwise specified in writing. Records shall be readily accessible upon request to the organization of its interested parties. All records are subject to review and approval prior to acceptance. The supplier must notify the respective agent and Quality representative prior to destruction of a quality record.

All blank lines on documentation shall be marked as "N/A" if not applicable. All other edits shall be noted with a single line-out with changes annotated with initials and/or stamp and date next to change, at a minimum. No ditto or other continuation marks are allowed.

QCC105 – Supplier Material Review Board (MRB) Authority: The supplier does not have MRB authority to disposition nonconforming product as use-as-is or repair related to organizational controlled drawings or specifications. Any nonconformance on such final deliverable product to the order, drawings, specifications, or other applicable documents shall be submitted for approval prior to usage or shipment, unless otherwise documented on the order.

QCC106 – Shelf Life: No product will be shipped with less than 80% of the full shelf-life as determined by the OEM/OCM unless previously approved in writing by the organization. Expiration dates shall be legibly recorded on the packaging and shipping documents. An SDS shall also be provided with the item, where applicable.

QCC107 – Temperature-Sensitive Product: The supplier shall identify temperature-sensitive product with the manufacture date, storage temperature, and recommended shelf life. In addition to normal identification requirements of name, type, size, lot/date code, quantity identification, and special handling conditions shall be recorded on the shipping documentation.

QCC108 – Notification of Nonconformances Responsibility: The supplier shall immediately inform the organization when there is a reason to suspect product may not conform to requirements. The supplier shall promptly inform the organization of any circumstance related to products, manufacturing, processing, methods, design, etc. which may make a product susceptible to premature failure or place the safe operation of product at risk. The notification shall describe the nature of the discovered anomaly, its applicability to the organization's part number, quantities affected, and the probable impact to product form, fit, or function. The supplier is responsible to notify the organization if they have received any corrective actions from the government or regulatory agencies within 30 days.

QCC109 – Control of Sub-Tier Suppliers: The supplier is responsible for the quality of all sub-tier products. The supplier shall flow down all applicable requirements to include but not limited to *General T&Cs*, Federal Acquisition Regulations (FARs), Defense Federal Acquisition Regulations (DFARs), and QCCs to sub-tiers performing work involving this order.

QCC110 – Supplier Corrective Action Request: A supplier corrective action request (SCAR) shall be forwarded to a supplier when corrective action is required. Upon notification of a nonconformance, immediate containment action shall be taken. The supplier shall complete the analysis of cause and propose corrective action within ten (10) calendar days or within the assigned due date noted on the supplier CPAR and its accompanying email. Failure to respond in a timely manner may result in removal from the Approved Suppliers List (ASL). Upon notification of the nonconformance, shipments may be suspended until containment processes are enacted.

QCC111 – Certificate of Compliance or Conformance (C of C): The supplier shall submit with each shipment either on its packing list, or attachments, a certificate of conformance (C of C), or certificate of compliance (C of C) which shall be dated and bear the signature and title of the supplier's Quality representative, stating the furnished product conforms to all requirements of the contract, drawings, and specifications. It shall also state the supporting documentation is on file and will be made available to organization and its interested parties upon request.

Certification shall include the following:

- Supplier's full name and address (Distributors should list OEM)
- Order number
- Part number and revision
- If applicable, serial numbers
- Order quantity
- Quantity shipped
- Lot/Date Code
- Name of sub-tier supplier and description of service provided
- Authorized signature and date
- C of C declaring the product or service has met order requirements to include drawings and specifications at the prescribed revision level

QCC112 – Product Substitution: The supplier shall not deliver substitute parts for the part specified unless the organization or its customer have approved the substitution in writing as evidenced by a formally released alternate parts document, other document, or instruction. For organizational-specified and -controlled drawings and specifications, the supplier shall not use substitute or alternate component parts or subassemblies without prior written approval. The supplier shall notify the organization of any diminishing, end of life, obsolescence, or form, fit, or function issues for ten (10) years beyond the order award date.

QCC113 – Safety Data Sheet (SDS): Where applicable, each purchased product shipment shall contain the appropriate hazard and precautionary information using Safety Data Sheets (SDSs) and labels meeting Global Harmonized System (GHS) requirements.

QCC114 – Right of Access: During the performance of the order, the organization and its interested parties reserve the right to attend, review, and participate in the supplier's quality system and associated manufacturing processes to include inspection and testing of any work related to the order. The organization and other interested parties shall be given the right to verify, at the supplier's or its sub-tier's site, product conformance.

QCC115 – Restricted Materials: Unless specifically called out in the organization's drawings and/or bill of material (BOM), material in Table 1 is restricted. Exceptions may be given but must be provided in writing with the suitable substitute's information.

Table 1. Restricted Material

Categories of Restricted Materials: • Beryllium alloys and Beryllium Compounds • Chromium and Chromium Compounds • Glycol ethers • Lead and lead compounds • Mercury and mercury compounds • Nickel and Nickel Compounds • Perchlorate Compounds • Polybrominated Diphenyl Ethers (PBDEs) • Restricted HAZMAT Categories listed in Table 1 of NAS411-1.
Compiled Lists of Restricted Materials • Extremely Hazardous Substances listed in 40 CFR 355, Appendix A of the EPCRA, Section 302 • Chemicals listed in 40 CFR 372.65, Paragraph A of the EPCRA Section 313 Toxic Release Inventory Chemicals • Hazardous substances listed in Table 302.4 of 40 CFR 302.4

QCC116 – Government- or Customer-Furnished Property: When applicable, property supplied by the government, the organization's customer, or the organization to be incorporated into the finished product shall be inspected upon receipt for evidence of acceptance and will be maintained throughout the manufacturing process.

QCC117 – Organization-Owned Tooling: All tooling created against order lines items are the sole property of the organization. The organization requires submittal of all tooling creations and revisions for approval prior to use, that is, unless authorized by the organization. No modifications to tooling shall be made unless consent is provided in writing. Tooling owned by the organization but at the supplier's site shall be controlled by a process, which, at a minimum, contains identification method, storage method, maintenance, and how changes are controlled.

The supplier shall take reasonable steps necessary to perform regular maintenance and inspections on tooling. The supplier agrees to notify the organizational immediately upon the discovery of tool loss, damage, or destruction. A nonconforming report and corrective action must be initiated and submitted to the organization prior to action by the supplier.

QCC118 – Foreign Object Debris (FOD) Prevention and Part Cleanliness: The supplier shall conduct production processes appropriate to prevent, detect, mitigate, and remove all FOD from product during manufacturing processes and provide parts clean and free of FOD prior to shipment per *AS9146, Foreign Object Damage (FOD) Prevention Program – Requirements for Aviation, Space, and Defense Organizations*. FOD, whether it is debris or damage for debris, will result in immediate rejection.

The supplier shall have and implement a documented plan addressing prevention, detection, prediction, control, reporting of, and treating of corrosion—deterioration of material or its properties due a reaction of said material within its chemical environment.

QCC119 – First Article Inspection (FAI): The supplier shall perform an FAI on organizational-controlled drawings and specifications per the latest revision of *AS9102, Aerospace First Article Inspection Requirement* or an organizational approved FAI, if one of the following conditions apply:

- First time submission (part or new supplier)
- Revision affecting form, fit, or function
- A process change used to manufacture the product
- Change in manufacturing location (facility)
- 12 months or longer have passed since the supplier last produced the product
- When requested by the organization or its interested parties

Subassemblies and/or detail parts where the supplier has design authority shall have FAI requirements as defined on the statement of work (SOW) or Order. If the order line item specifies a buyer- or supplier-designed product with standard commercial-off-the-shelf (COTS) hardware included at the subassembly levels, an FAI is not required. All FAIs performed by the supplier will be accompanied with a First Article Inspection Report (FAIR) and all other approved documentation showing conformance to the order, drawing, or other specified requirement.

Note: This supplier QCC does not apply to COTS Items.

QCC120 – Change Notification: Product described on the organization's drawing is the only approved configuration. The supplier shall provide written notification to the respective agent prior to manufacturing of any listed change as follows:

- Manufacturing locations
- Changes in key suppliers
- QMS
- Quality management personnel
- Ownership and executive management
- Machines and equipment changes

These changes include but are not limited to supplier-owned design items where design is created from the organization's specifications. The supplier shall communicate this requirement to all sub-tiers. To submit change requests, contact the respective agent. Suppliers are encouraged to submit change requests to improve quality, reliability, and process capability, as well as reducing costs and lead times to the respective agent 30 days prior to plan implementation.

QCC121 – Rejection of Product Using Sample Inspections: The organization reserves the right to reject an entire lot if defects are detected upon or after receipt.

QCC122 – Drop-Shipped Product: When requested to drop ship product to a location other than the organization's ship to address, the supplier shall include a copy of the order along with all required data and certifications specified by the order's QCCs. The supplier will also send an electronic copy of the packing slip and tracking information to the respective agent at time of shipment. The supplier will ensure source inspection is performed or a waiver for such inspection is received from the organization's Quality representative prior to shipment if the order contains a source inspection QCC.

The receiving organization of drop-shipped material will notify the organization's respective agent when parts and materials are received. The receiver will also verify the appropriate type and quantity of materials and ensure such materials are undamaged by handling and shipping. The receiver will notify the respective agent of any problems or concerns with received materials.

Series 200 Quality Clauses

QCC200 – Solderability: All parts requiring soldering shall meet industry standards for hand and machine soldering. The supplier shall ensure compliance to *J-STD-002, Solderability Tests for Component Leads, Terminations, Lugs, Terminals and Wires*. Components requiring tinning shall be tested and certified.

QCC201 – Electrostatic Discharge (ESD) Control: All ESDS devices shall be packaged, marked, and handled per *ANSI/ESD S20.20, Protection of Electrical and Electronic Parts*.

QCC202 – Printed Wiring Boards (PWBs): PWBs shall comply with *IPC-A-600, Acceptability of Printed Boards* unless otherwise specified. Unless otherwise specified on the order or drawing, PWBs must meet the requirements set forth in *J-STD-003, Solderability Test for Printed Boards*.

Notes:

- The supplier will default to Class 3 requirements if the class is not specified.
- This QCC does not apply to COTS Items.

QCC203 – Circuit Card Assemblies (CCAs): CCAs will comply with *IPC-A-610, Acceptability of Electronic Assemblies Endorsement Program* unless otherwise specified. CCAs will comply with *J-STD-001, Requirements for Soldered Electrical and Electronic Assemblies* unless otherwise specified.

Notes:

- The supplier will default to Class 3 requirements if the class is not specified.
- This QCC does not apply to COTS Items.

QCC204 – Wiring Harnesses: Cables and wiring harnesses shall comply with *IPC/WHMA-A-620, Requirements and Acceptance for Cable and Wire Harness Assemblies* unless otherwise specified. Cables and wiring harnesses must be 100% electrically tested per IPC/WHMA-A-620. Wiring inspections will comply with *SAE AS50881, Wiring, Aerospace Vehicle*.

Notes:

- The supplier will default to Class 3 requirements if the class is not specified.
- This QCC does not apply to COTS Items.

QCC205 – Rework/Repair Authorization of Circuit Card Assemblies: Rework shall be in accordance with *IPC-7711/7721 Rework, Modification and Repair of Electronic Assemblies*. Repair shall be in accordance with IPC-7711/7721 only after approval from the organization via its customer.

QCC206 – Moisture-Sensitive Components: The supplier shall ensure packaging and handling of all moisture-sensitive components, as classified by, and per *IPC/JEDEC J-STD-033 Handling, Packing, Shipping, and Use of Moisture, Reflow, and Process Sensitive Devices* and *IPC/JEDC J-STD-020, JOINT IPC/JEDEC Standard Moisture/Reflow Sensitivity Classification for Non-hermetic Surface Mount Devices (SMDs)*, or other documented procedure.

QCC207 – Magnetic Core Packaging Requirement: Magnetic cores shall be bagged and boxed in a manner that prevents each from contacting each other.

QCC208 – NDT Requirements for Die Castings: Die casting must meet the non-destructive testing (NDT) x-ray requirements per *ASTM E505, Standard Reference Radiographs for Inspections of Aluminum and Magnesium Die Castings*. Die casting must be penetrant inspected per *ASTM E1417, Standard Practice for Liquid Penetrant Testing* Type 1 method A. Cracks, hot tears, cold shuts, and thru-wall voids/porosity are not allowed and will result in further investigation up to and including rejection. Die castings shall be selected in accordance with the sampling plan within *AMS 2175, Classification and Inspection of Castings*. Requirement applies after completion of all machining operations. In the event of a conflict, requirements take precedence over other standards.

QCC209 – Special Processes: Special processes are any processes for production and service provision where the resulting output cannot be verified by subsequent monitoring or measurement and, therefore, deficiencies become apparent only after the product is in use or the service has been delivered.

Process certifications are required for all special processes and shall be submitted to the organization with the delivered product and meet C of C requirements, with the additional requirement of stating the process being certified. If the special process was outsourced, the certificate shall originate from the organization performing the special process.

The supplier shall ensure all personnel performing special processes such as welding, soldering, plating, NDT, non-destructive inspection (NDI), etc. are certified to perform the special process per the specification, order, or any specification referenced directly or indirectly therein. The supplier shall ensure equipment used is also appropriately certified, calibrated, verified, and maintained. This QCC is applicable to sub-tier suppliers performing special process.

QCC210 – Fastener Quality Assurance Requirement: Specified items are or may contain at least Grade 5 fasteners as defined in *SAE J429, Mechanical and Material Requirements for Externally Threaded Fasteners*. The supplier is required to maintain a Fastener Quality Assurance Program. Specific details are included with the order by a Fastener Quality Assurance Program Outline.

QCC211 – FAI – Source Inspection Required: This QCC supersedes QCC119 with alternate methodology as described within. The supplier must contact the organization with a 10-calendar day advance notice to witness the FAI. The supplier shall furnish, at no charge to the organization, all necessary facilities, personnel, and equipment to perform required inspections and tests.

QCC212 – FAI – Advance Submission: This QCC supersedes QCC119 with alternate methodology as described within. The supplier must submit a FAIR and receive approval prior to shipment.

QCC300 – Unique Identification (UID) Marking*:* UID marking required on labels, decals, or metal plates shall adhere to *MIL-STD-130, Identification Marking of U.S. Military Property*. UID marking is required for assemblies, subassemblies, components, or parts, including all new or modified support equipment, tooling, special test equipment, etc. that may be a serially managed, mission essential or an inventory-controlled item.

Sampling of the verification of the UID marking requirements shall be per *ANSI/ASQC Z1.4, Sampling Procedures and Tables for Inspection by Attributes* using general Inspection Level II and single sampling plans for reduced inspection at an Acceptance Quality Limit (AQL) of 1.0. The first and last UID marking on labels, decals, or metal plates of the lot shall be part of the verified samples.

For deliverables: The C of C shall state the labels, decals, or metal plates were manufactured in accordance with *MIL-STD-130, Identification Marking of U.S. Military Property* and verified per *ISO/IEC 15415, Information Technology, Automatic identification and data capture techniques—Bar Code Symbol Print Quality Test Specification–Two-Dimensional Symbols*. The C of C shall also state the grade that was achieved when verified per ISO/IEC 15415. A legible and reproducible copy of the verification that was performed on the labels, decals, or metal plates of the sample shall be included with each shipment.

QCC301 – Eye Examinations: Personnel certified to perform inspection and test functions shall have a periodic eye exam not to exceed 1 year. The standard of acceptance for vision test are as follows:

- Natural or corrected near distance acuity such that the inspector/tester is capable of reading J1 letters on a standard Jaegers chart of equivalent for near vision. This requirement shall be met by either one or both eyes.
- Ability to distinguish between colors when required by work.

QCC302 – Qualified Products List (QPL): One or more of the items within the order are required to be produced by a QPL supplier. Certifications must contain evidence of manufacture by a QPL source.

QCC303 – Printed Wiring Boards (PWBs): PWBs shall be fabricated and tested per drawing requirements. Solderability testing shall be in accordance with *J-STD-003 Solderability Tests for Printed Boards*. 100% testing is to be performed on all lots. PWBs are rejectable if the following are not adhered to:

- One coupon per panel maintained by the supplier.
- Each PWB, and its associated coupon, marked with a serial number traceable to the production panel.
- A copy of the lot inspection and acceptance data readily available.
- A documented microsection report with the plated through hole copper thickness for each inspection lot.
- A serial number list showing the final disposition of all PWBs/panels in the lot.
- Shipped PWBs e packaged with desiccant, a moisture indicator, and in ESDS packaging.
- PWB date codes shall not exceed 365 days before the date of shipment.

Notes:

- PWBs with date codes exceeding 365 days may be shipped to the organization with prior written approval. If PWBs pass solderability testing, acceptance will occur.
- This QCC does not apply to COTS Items.

QCC304 – Calibration Subcontractor Requirements: Calibration shall be in accordance with *ANSI/NCSL Z540-3, Requirements for the Calibration of Measuring and Test Equipment* or *ISO 10012-1, Quality Assurance Requirements for Measuring Equipment and traceable to the National Institute of Standards and Technology (NIST)*. The subcontracting, assigning, or transferring of any activities covered to another supplier facility/location or sub-tier supplier shall receive prior approval by the organization's Quality representative, or designee.

The following information shall be submitted for each piece of monitoring and measuring equipment completed. Certificate of Calibration and/or Record of Calibration shall contain the following information:

- Title of document
- Supplier's name and address
- Organization's name and address
- Description and unique identification of the item calibrated
- Condition of the item calibrated if not operational
- Date calibration performed
- Identification of the procedure(s) used
- Identification of the calibration service provider's equipment, standards used and last calibration date
- Environmental conditions (temperature and humidity)
- Test Report detailing as-found and as-left conditions
- Reference to any independent Out-Of-Tolerance Condition Report
- Signature and title of who performed the calibration
- Statement that supplier equipment and reference standards utilized to calibrate the organization measuring and monitoring equipment are NIST traceable

Attach the calibration sticker to the face area of any stackable equipment where the sticker will not impede visibility or functionality. Sticker must indicate the next calibration due date at a minimum.

QCC305 – As-Built List (ABL): The supplier shall track and record the as-built configuration by serial number including serialized lower level subassemblies. An ABL shall include the part number, serial number (when applicable), lot/batch numbers (when applicable), quantity, completion date, and ship-to location with the shipment.

QCC306 – Flow Plan - Manufacturing, Inspection, and Test: The supplier shall provide a flow plan (diagram, traveler, etc.) documenting the sequence, location, and description of manufacturing processes, inspections, and tests. This plan shall be submitted to the organization for approval within thirty (30) days prior to use.

QCC307 – Circuit Card Assembly (CCA) Test: The supplier shall perform 100% electrical testing on CCAs to identify any defects prior to delivery. Tests such as in-circuit Test (ICT), bed of nails, flying probe, or other manufacturing defect analyzer (MDA) may be used. CCA Test Reports including the test procedures conducted, pass/fail results by serial number, and authorization by a representative of the supplier's quality function shall accompany each shipment.

QCC308 – Data Deliverables: The supplier shall provide a copy of any data deliverable for each item in the supplier's format or as authorized by the supplier's Quality representative with each shipment.

The supplier shall ensure all personnel performing special processes, inspections, and testing are certified to perform the function and any specifications referenced directly or indirectly. The supplier shall ensure the associated equipment and laboratory used for these processes is certified, as appropriate.

QCC308a – Data Deliverables – NDT/NDI Report: An NDT/NDI report for the testing and inspection method—X-ray Ultrasonic, Liquid Penetrant, Magnetic Particle—shall accompany each shipment. Each report shall be signed and dated by the appropriate levels: generally, a Level 2 that performed the test and/or inspection, and the Responsible Level 3 who bears the reports final approval.

QCC308b – Data Deliverables - Critical Dimension Report: The supplier shall provide a critical dimension report as specified in the order.

QCC308c – Data Deliverables - Full Dimension Report: The supplier shall provide a Full dimensional report as specified in the order.

QCC308d – Data Deliverable - Acceptance Test Procedure/Test (ATP/ATT) Data Sheet: An ATP/ATT and any subsequent changes must be submitted for approval thirty (30) days prior to deliverable tested end items. Completed data sheets must contain at a minimum:

- Identification of the item being tested (Part number, description, revision, and serial numbers, if applicable)
- Specification requirement
- Minimum and maximum limits
- Actual results
- Indication of pass or fail
- Who performed the test/inspection
- Date the test/inspection was performed

QCC308e – Acceptance Test Plan (ATP): A detailed ATP must be submitted to the organization for review and approval. The ATP shall consist of a test plan and list of equipment used during the test/inspection. All changes must be approved prior to the first delivery against the order.

QCC308f – Data Deliverables - Repair Reports: The supplier shall provide a repair report, authorized by the organization's quality representative and supplier's quality function, that documents the materials, reason for repair, and activities utilized in returning the product to its fully functional/operational status.

QCC308g – Data Deliverables - Inspection reports: The report must include the actual measured value and be traceable to the product lot code/batch number and/or serial number. Dimensional inspection data for all critical and major characteristics defined by the drawing and/or order and indication of acceptance for minor characteristics shall be included for all product delivered under the order. All Inspection records submitted are subject to the organization review and approval prior to acceptance.

QCC308h – Data Deliverables - Certificate of Analysis (C of A): A C of A is required to accompany all materials supplied against the order as well as all material, chemical, and mechanical reports.

The C of A will include:

- Customer name
- Manufacturer's name
- Country of origin/melting/smelting
- Specification number
- Material grade
- Material marking
- Material condition
- Size
- Heat lot number
- Heat condition
- Date code
- Chemical analysis (specification requirements and results)
- Physical properties applicable to the procured material (specification requirements and results)

QCC308j – Data Deliverables - Certification of Solderability: The supplier shall perform solderability testing when specified in the order.

QCC308k – Data Deliverables - Welding Certifications: The supplier shall provide welding certifications when specific in the order.

QCC308m – Data Deliverables: Hydraulic Cleanliness: The supplier shall provide hydraulic cleanliness reports when specified in the order.

QCC308n – Data Deliverables - Supplier Inspection and Test Plan: The supplier shall prepare a detailed inspection plan including all measurement and testing methods. The plan shall include name, type, accuracy, and calibration date of measuring and monitoring equipment along with measuring record forms required for in-process and/or final acceptance of product. For measurement or testing of parts performed in-process, plan shall include the process flow. An inspection plan requires approval by organization's quality representative prior to delivery of the first piece.

QCC308p – Data Deliverables - Qualification Test Reports: The supplier shall provide qualification test reports when specified in the order.

QCC308q – Data Deliverables - Certificate of Test (C of T): All product supplied against this order will be accompanied by a C of T. The C of T will be dated and signed by the responsible supplier's representative certifying the product meets all order requirements, specification, and drawing requirements.

Certifications must include the following:

- Organization's order number
- Organization's part number, revision, serial numbers, and date/lot codes where applicable
- Order quantity
- Quantity shipped
- Name of approved lower-tier supplier and descriptions of service provided (if applicable)
- Authorized signature and date
- Name and address of testing facility/laboratory
- Date and run time, if applicable

QCC308r – Data Deliverables - Cable Harness Test Report: Supplier shall provide detailed continuity test results for all short and open connections to verify conformance to specifications.

QCC308t – Data Deliverables - Circuit Card Assembly (CCA) Test: The supplier shall perform 100% electrical testing on CCAs as required by the order to identify and correct manufacturing defects prior to delivery. Tests such as in-circuit Test (ICT), bed of nails, flying probe, or other manufacturing defect analyzer (MDA) may be used. CCA test reports including the CCA test procedures conducted, pass/fail results by serial number, and authorization by a representative of the supplier's quality function shall accompany each shipment.

QCC308u – Data Deliverables - Certification off Special Processes: The supplier shall provide a special process certification as noted in the order.

QCC309 – Source Inspection at Supplier's Facility: Product supplied requires source inspection by the organization's representative prior to shipment. This requirement must not be bypassed without written authorization from the organization's Quality representative. The supplier shall notify the organization at least ten (10) days in advance of the date product is expected to be ready for inspection; mandatory hold points (MHP) may be required. The organization may designate MHP defining operations in the supplier's manufacturing and/or inspection sequence that require witnessing by the organization or its customer. This activity shall be performed in such a manner to not disrupt normal processing and shall be conducted on a non-interference basis. If any inspection or test is made by the organization, and/or its customers, of a supplier or a subcontractor, the supplier without additional charge, shall provide a safe place to work and reasonable facilities and assistance for the convenience of the organization, and/or its customer(s) in the performance of their duties. If the organization or its customer requires that an inspection or test is made at a point other than at the premises of the supplier or a subcontractor, it shall be at the expense of the organization except as otherwise provided in the order. In case of rejection, the organization shall not be liable for any reduction in value of samples used in connection with such inspection or test.

QCC310 – Government Source Inspection (GSI): If specified in the order, GSI shall be required prior to shipment from the supplier's facility. Upon receipt of this order, promptly notify and provide a copy of this order to the government representative who normally services the facility so appropriate planning for government inspection can be accomplished. In the event the representative cannot be located, the supplier shall contact the organization's respective agent.

Unless otherwise agreed to in writing, the supplier shall provide the Government Representative with:

- Ten (10) working days advance notification of readiness for performance or witnessing of government designated inspections or test.
- All applicable documents requested and reasonable conditions for conducting or witnessing the inspection or test.

QCC311 – Machined Parts: When the following parts, characteristics, or processes are required by drawings, the supplier shall comply with the following additional instructions:

- Serial Numbers: The supplier must contact the organization's respective agent and request serial numbers before manufacturing begins. Serial numbers are controlled and issued by the organization to avoid duplication and meet specification requirements.
- Anodize: When *MIL-A-8625, Anodic Coatings for Aluminum and Aluminum Alloys* is invoked by the drawing, the sealing must be done only in boiling, deionized water to provide natural appearance when performing compliance to the standard unless otherwise specified.

Notes:

- During the cleaning process, pay special attention to the bottom of blind or tapped holes.
- This QCC does not apply to COTS Items.

QCC312 – Returned Supplier Material: Supplier material delivered that is rejected and returned on a supplier return material authorization (RMA) for evaluation and rework/repair, shall be shipped with a rework/repair report documenting the failure description, detailed failure cause(s), and repair action(s) taken to restore the product to its requirements. All shipping documents shall reference the RMA number. If subject to GSI, product shall be resubmitted to the for acceptance prior to shipment to the organization.

QCC313 – Supplier Material Review Board (MRB) Authority Alternate: The supplier does not have MRB authority to accept as is or repair nonconforming product being delivered. Any nonconformance on the final deliverable product to the order, drawing, specifications, or applicable documents must be submitted for approval prior to usage or shipment, unless otherwise documented.

QCC314 – Witness Samples/Coupons: Supplier shall provide lot-related witness and/or coupon samples for all FAIRs as specified by the technical data package. All other witness samples for production lots will be retained by the supplier and provided to the organization and its customer upon request.

QCC315 – Supplier Process Control: These requirements apply to suppliers and their sub-tier suppliers. Each supplier level shall utilize statistical process control (SPC) techniques as a preferred methodology to ensure production hardware quality and conformity. SPC shall be used to measure, analyze, and eliminate sources of variations detrimental to product quality. SPC shall be administered in areas of highest potential benefit and/or on critical characteristics flown down in drawings. The supplier shall prepare a Process Control Plan and utilize it during production of the products specified in order. COTS materials exceptions may be made when approval is provided from the customer and the appropriate DCMA-approved certification.

The plan should contain, as a minimum, the following:

- Process Flow Diagram
    - A representation of the process flow and the sources of variations of equipment, materials, methods, and persons from process start to end. The flow diagram should show the test and inspection points and all characteristics to be monitored and/or statistically controlled.

- Key Characteristics
    - Key characteristics are product characteristics considered to have a significant impact on the form, fit, or function of the product and/or influence customer perception of the end product.
    - Key characteristics are characteristics that are significantly impacted by the manufacturing method or have a significant impact on subsequent operations.
    - Key characteristics shall be identified on drawing features with the "Δ" symbol with an accompanying notation identifying the feature as a critical characteristic or with the symbol.

Note: When suppliers do not deliver products based on the organization's drawings and no critical to quality (CTQs) are defined, key process indicators (KPIs) from the supplier may be used. KPIs indicate how well a process or product performs. KPIs can be a product performance parameters or process performance metrics, such as first pass yields and attribute SPC data. KPIs should be agreed upon between the organization and supplier and shall be noted in the order.

- Process Capability:
    - Key characteristics where SPC has or will be applied shall complete a process capability study for each key characteristic. The capability will include a consecutively run of product. When order quantities do not allow the use of 10 parts, contact the organization's Quality and respective agent for the agreed upon sample number. The process must be in statistical control. The study must demonstrate a minimum Cpk of 1.33 or greater for production capability. If process capability is not demonstrated for key characteristics, features shall be 100% inspected. Upon demonstration, the feature can be reduced to a valid sampling plan.

QCC316 – Failure Mode and Effect Analysis (FMEA) Requirements: Early in the preliminary design phase, the hardware developer is required to identify specific reliability concerns and the steps being taken to mitigate them. The hardware developer is required to conduct either a Concept, Design, or Process FMEAs to a sufficient level of detail that mission critical failures are identified and effectively dealt with. FMEA results shall reported to the respective agent as defined within the order. The supplier shall complete a FMEA for the items produced and furnished as part of the order. The supplier shall conduct the applicable FMEA noted below. The

requested FMEA is based on the description as follows:

- **Concept Failure Mode and Effects Analysis (CFMEA):**
    - Shall be performed if the supplier of product(s) is the design agent of the item.
    - Analyzes concepts for systems and subsystems in the early stages of design and conception.
    - Focuses on potential failure modes associated with the proposed functions of a concept proposal caused by design decisions that introduce deficiencies, such as design decisions about the process layout.
    - Includes the interaction of multiple systems and interaction between the elements of a system at concept stages.
    - Shall be updated and resubmitted whenever a design change occurs.
- **Design Failure Mode and Effects Analysis (DFMEA):**
    - Shall be performed if the supplier of product(s) is the design agent of the item.
    - Analyzes products prior to production release.
    - Identifies failure modes caused by design deficiencies and help identify Critical to Quality (CTQ) features or characteristics.
    - Shall be updated and resubmitted whenever a design change occurs.
- **Process Failure Mode and Effects Analysis (PFMEA):**
    - Shall be performed by the supplier that manufactures or produces the item.
    - Analyzes manufacturing and assembly processes.
    - Its focus is on:
        - Potential product failure modes caused by manufacturing and/or assembly process deficiencies.
        - Confirming the need for special controls in manufacturing.
        - Confirms the identification of CTQ features or characteristics.
        - Identifying process failure modes that could violate government regulations and compromise product safety.
        - Identifies processes requiring error proofing to reduce process variability.
    - Should be updated and resubmitted whenever there is a process escape or an issue is found.

QCC317 – Lot/Batch Control: Products supplied under the order shall be identified by the manufacturing lot/ batch number. If it is not practical to stamp individual products due to size or shape, the lot/batch number shall be stamped on identifying tags. All accompanying documents, such as packing list or certifications, shall include lot/batch number.

QCC318 – Charge Back: The organization reserves the right to charge back incurred costs due to supplier nonconformance.

QCC319 – Obsolescence: CCA suppliers are required to inform the organization of component availability risk discovered at any time during the performance of this contract. Notice, impact, and recommendations are expected to be communicated no more than ten (10) days from discovery through the respective agent or equivalent method. The supplier shall notify the organization of any diminishing, end of life, obsolescence, or form, fit, or function issues over the entire period of performance.

QCC320 – Responsible Waste Practices: The supplier shall ensure hazardous wastes are disposed of in an environmentally responsible manner. Disposal of hazardous wastes should be controlled

and delegated to specialized hazardous waste disposal firms with an established EMS based on ISO 14001.

QCC321 – GIDEP: The supplier shall participate in the GIDEP. The supplier shall review all GIDEP alerts, GIDEP safe alerts, GIDEP problem advisories, and GIDEP action notices to determine the organizations or its customer's product or service.

For those affecting the program, the supplier shall take action to eliminate or mitigate any negative effect to an acceptable level. The supplier shall generate the appropriate failure experience data report(s) whenever failed or nonconforming items, available to other buyers, are discovered during the product's life cycle. The supplier shall not deliver product containing material subject to a GIDEP alert.

QCC322 – Software Configuration Management: Supplier shall employ a configuration management (CM) system that ensures all versions of software deliverables are maintained and reproducible. This CM system shall ensure all work products are managed, defined, tracked, tested, and its changes controlled. All software and firmware must use Electronics Engineers/Electronic Institute Association (IEEE/EIA) standards 12207.0 through 12207.2 as a guide.

Each software report must include:

- Software schedule
- Software organization (staffing)
- Software defects
- Integration points
- Capability progress, e.g., burndown charts
- Other metrics used to manage software and firmware's development

All software metric reports shall be delivered by way of electronic media.

QCC323 – Software Reviews: All software deliverables are subject to review and approval by the organization. A software requirements review shall occur prior to commencement of software design activity. A design review shall occur prior to commencement of implementation activity. The supplier shall support and participate in all reviews.

QCC324 – Painted Parts: Painted parts and assemblies must meet the requirements specified by engineering.

QCC325 – Lead-Free Control Plans: Supplier shall document and utilize a Lead-Free Control Plan. This plan assures deliverable electronics products will satisfy the applicable requirements for performance, reliability, and safety throughout the specified performance life. This requirement shall be flowed down to all electronic sub-tier suppliers.

QCC326 – Counterfeit Material: Supplier shall maintain an effective Preventive and Control of Counterfeit Parts program using AS6174, AS6081, AS5553, and other applicable prevention and control of counterfeit parts program standards/specifications as information and guidelines. If potential latent counterfeit parts are determined a written notice to Buyer's Quality Management and Procurement is required within 24 hours of discovery.

QCC327 – False, Fictitious and Fraudulent Statements: Supplier must agree to include the following statement preprinted on each manufacturing, inspection, or test record used in conjunction with the subject subcontract:

> "The recording of false, fictitious, or fraudulent statements or entries on this document may be punishable as a felony in accordance with applicable federal statutes."

3. References

- PLN-QA-0001, Counterfeit Prevention Plan
- QSP-QA-0001, Corrective and Preventive Action Process
- QSP-QA-0002, Control of Nonconforming Products Process
- QSP-QA-0004, Prevention of Counterfeit Product Process
- AMS 2175, Classification and Inspection of Castings
- AS9102, Aerospace First Article Inspection Requirement
- AS50881, Wiring, Aerospace Vehicle
- AS5553, Counterfeit Electronic Parts; Avoidance, Detection, Mitigation, and Disposition
- AS6081, Fraudulent/Counterfeit Electronic Parts: Avoidance, Detection, Mitigation, and Disposition – Distributors
- AS6174, Counterfeit Materiel; Assuring Acquisition of Authentic and Conforming Materiel
- AS9146, Foreign Object Damage (FOD) Prevention Program – Requirements for Aviation, Space, and Defense Organizations
- ANSI/ESD S20.20, Protection of Electrical and Electronic Parts
- ASTM E505, Standard Reference Radiographs for Inspections of Aluminum and Magnesium Die Castings
- ASTM E1417, Standard Practice for Liquid Penetrant Testing
- ERIA URL: ERIA
- GIDEP URL: GIDEP
- ISO 10012, Measurement management systems – Requirements for measurement processes and measuring equipment
- ISO/IEC 17025, General requirements for the competence of testing and calibration laboratories
- IPC-A-600, Acceptability of Printed Boards
- IPC-A-610, Acceptability of Electronic Assemblies Endorsement Program
- IPC/WHMA-A-620, Requirements and Acceptance for Cable and Wire Harness Assemblies
- IPC-7711/7721 Rework, Modification and Repair of Electronic Assemblies
- IPC/JEDC J-STD-020, JOINT IPC/JEDEC Standard Moisture/Reflow Sensitivity Classification for Non-hermetic Surface Mount Devices (SMDs)
- IPC/JEDEC J-STD-033, Handling, Packing, Shipping, and Use of Moisture, Reflow, and Process Sensitive Devices
- J-STD-001, Requirements for Soldered Electrical and Electronic Assemblies
- J-STD-002, Solderability Tests for Component Leads, Terminations, Lugs, Terminals and Wires
- J-STD-003, Solderability Test for Printed Boards
- J-STD-013, Implementation of Ball Grid Array & Other High Density Technology
- MIL-A-8625, Anodic Coatings for Aluminum and Aluminum Alloys
- MIL-DTL-5541, Chemical Conversion Coatings On Aluminum And Aluminum Alloys
- MIL-STD-130, Identification Marking of U.S. Military Property
- ANSI Z540.3, Calibration Laboratories and Measuring and Test Equipment – General Requirements
- SAE J429, Mechanical and Material Requirements for Externally Threaded Fasteners

4. Quality Records

- FM-QA-0001, Corrective and Preventive Action Request
- FM-QA-0002, Nonconformance Report
- Purchase Package (PRs, PO, Invoices, Packing Lists)
- Subcontract Package (SOW, Subcontract, Invoices, Approvals)