

**Q CLAUSES  
COMTECH QUALITY REQUIREMENTS  
FORM 1991**

**1.0 PURPOSE**

This document establishes the procurement quality requirements (Q Clauses), which are applicable when expressly specified in the procurement document.

**2.0 DEFINITIONS**

- Buyer: Procurement entity
- Seller: The legal entity that is the contracting party with Buyer with respect to the procurement document.
- Procurement Document: The Purchase Order (PO) or subcontract between the parties.
- Item: The product or service contracted for by the procurement document.

**Q1. GENERAL QUALITY ASSURANCE REQUIREMENTS**

(Include paragraphs A through L below)

**A. PROHIBITED PRACTICES**

- Unauthorized repairs: Seller shall not repair any damaged item, nor any found to be faulty during manufacturing, or that fails to meet Buyer specification/drawing requirements, without Buyer's written approval, except when the nonconformance is Minor and material review board (MRB) authorization has been granted by Comtech.
- Seller shall not change any drawing, process, material (including subtier supplier parts), or procedure without prior Buyer written approval, if such drawing, process, material, or procedure was previously approved by Buyer, as provided for in the procurement document. Seller shall not change any process, material, or procedure from that used to qualify any item or which was used by Seller to become a qualified source for Buyer specification/drawing, without Buyer written approval. This is not applicable to DSCC Standard Military drawings.
- Notification of Facility Change: Seller shall not use nor relocate any production, manufacturing, and/or processing facilities to differ from previous approval by Buyer, during performance of work specified in the procurement document, without previously notifying Buyer and affording Buyer an opportunity to examine such facilities for compliance with procurement Quality requirements.  
Changing of Test Facility: Seller shall not change a test facility nor use another test facility to meet specification/drawing requirements without prior Buyer written approval, when a specific test facility was previously approved by the Buyer as provided for in the procurement document.
- Change of Management/Owner: Seller shall notify Buyer when a significant change in management or ownership has occurred.

**B. RESPONSIBILITY OF CONFORMANCE**

- Neither surveillance, inspection and/or test made by Buyer or its representatives or US Government representatives at either Seller's or Buyer's facility, nor Seller's compliance with all applicable procurement quality requirements, shall relieve Seller of the responsibility to furnish an item that conforms to the requirements of the procurement document.
- Seller shall control subtier supplier procurements to the extent necessary to ensure quality requirements specified in the procurement documents are satisfied. Quality requirements shall include but are not limited to, the following: subtier supplier pre-award survey/evaluations, periodic auditing of supplier, implementing a subtier supplier rating system, ensuring adequate review of procurement documentation prior to procurements, controlling procurement of critical items for Seller product, inspection of procured items to documented procedures, and control of non-conforming material, including corrective action.

**C. BUYER SURVEY, SURVEILLANCE, AUDITS AND INSPECTION**

- Buyer has the right to conduct surveys, audits and surveillance of Seller facilities and those of Seller subtier suppliers with prior coordination with Seller, to determine capability to comply, and to verify continuing compliance with the requirements of the procurement document.
- Buyer has the right to perform inspection at Seller facilities, and those of Seller subtier supplier with prior coordination with Seller, during the period of manufacturer and inspection prior to shipment.

#### **D. DOCUMENTATION**

Buyer may refuse to accept item if Seller fails to submit certifications, documentation, test data or reports specified by the procurement document.

#### **E. CORRECTIVE ACTION REQUEST**

When a quality problem exists with any Seller item, Buyer may forward a "Corrective Action Request" to Seller, requiring timely response that shall include the following information: analysis of the cause of the problem, statement of the action taken to prevent recurrence, and the affectivity of the action. When corrective action is required for U.S. Government source inspected items, Seller shall coordinate such action with the U.S. Government quality representative assigned to Seller Facility.

#### **F. U.S. GOVERNMENT SOURCE INSPECTION**

For procurements made under U.S. Government contracts, the U.S. Government has the right to inspect any and all of the work included in the procurement document, at Seller facilities or at subtier supplier facilities. Seller quality control or inspection system and manufacturing processes are subject to review, verification and analysis by authorized U.S. Government representatives.

#### **G. MEASURING AND TEST EQUIPMENT**

Seller shall be responsible for validating the accuracy and stability of tools, gages and test equipment used to demonstrate that any item conforms to the requirements specified by the procurement document. Documented schedules shall be maintained to provide for periodic calibration to adequate standards. Objective evidence of calibrations shall be recorded and made available for Buyer review.

#### **H. NONCONFORMING MATERIAL**

Any decision to accept any nonconformance (variance from Buyer drawings and specifications), detected at Seller facilities, must be made by Buyer unless otherwise specified by the procurement document. Seller shall provide for identification, control and segregation of non-conforming material detected at Seller facilities.

#### **I. ELECTRO-STATIC DISCHARGE REQUIREMENT**

For ESDS (Electrostatic Discharge Sensitive) items, the Supplier shall establish and maintain a written electrostatic discharge control program for the control of Electro-Static Discharge (ESD) during fabrication, handling, and packaging of electrical and electronic parts, assemblies, and equipment. The program must comply with the requirements of the most current version of Mil-Std-1686 or ANSI/ESD S20.20.

#### **J. FOREIGN OBJECT DAMAGE (FOD) CONTROL**

The supplier shall ensure that Foreign Objects and subsequent Foreign Object Damage (FOD) are eliminated from all parts prior to shipment. In addition all suppliers must maintain a FOD free environment during machining, manufacturing, assembly, maintenance, inspection, storage, packaging and shipping. Suppliers are required to maintain a FOD prevention program, which includes prevention and elimination of FOD from the manufacturing processes and work area.

#### **K. COUNTERFEIT PART WORK/PREVENTION**

1. For purposes of this clause, Work consists of those parts delivered under this Contract that are the lowest level of separately identifiable items (e.g., articles, components, goods, and assemblies). 'Counterfeit Work' means Work that is or contains items misrepresented as having been designed and/or produced under an approved system or other acceptable method. The term also includes approved Work that has reached a design life limit or has been damaged beyond possible repair, but is altered and misrepresented as acceptable.

2. Seller agrees and shall ensure that Counterfeit Work is not delivered to Buyer.

3. Seller shall only purchase products to be delivered or incorporated as Work to Buyer directly from the Original Component Manufacturer (OCM)/Original Equipment Manufacturer (OEM), or through and OCM/OEM authorized distribution chain. Work shall not be acquired from independent distributors or brokers unless approved in advance in writing by Buyer.

4. Seller shall immediately notify Buyer with the pertinent facts if Seller becomes aware of or suspects that it has furnished Counterfeit Work. When requested by Buyer, Seller shall provide OCM/OEM documentation that authenticates traceability of the applicable OCM/OEM.

5. In the event that Work delivered under this Contract constitutes or includes Counterfeit Work, Seller shall, at its expense, promptly replace such Counterfeit Work with genuine Work conforming to the requirements of this Contract. Notwithstanding any other provision in this Contract, Seller shall be liable for all costs relating to the removal and replacement of Counterfeit Work, including without limitation Buyer's cost of removing the Counterfeit Work, of reinserting replacement Work and of any testing necessitated by the reinstallation of Work after Counterfeit Work has been exchanged. The remedies contained in this paragraph are in addition to any remedies Buyer may have in law, equity or under any other provision of this Contract.

6. This clause applies in addition to any quality provision, specification, statement of work or other provision included in this Contract addressing the authenticity of Work. To the extent such provisions conflict with this clause or equivalent provisions in lower tier subcontracts for the delivery of items that will be included in or furnished as Work to Comtech.

**L. Acceptance of this purchase order indicates compliance to the requirements of Quality Clause Q-1 A through K, General Quality Assurance Requirements and compliance to the following elements:**

- The items furnished per the Buyer procurement document have been manufactured, tested and inspected in accordance with the requirements of the applicable specifications/drawings and the results of such tests and inspections meet the requirements thereof.
- That buyer required inspections and tests have been performed utilizing calibrated equipment.
- All material used in items furnished meet the applicable specification/drawing requirements specified by the procurement document.

**Q5. INSPECTION SYSTEM REQUIREMENTS (MIL-I-45208)**

Seller shall provide and maintain an inspection system that is in conformance with either MIL-I-45208, MIL-Q-9858A, ISO 9001 or AS9100, "Inspection System Requirements", and a calibration program that is in conformance with MIL-STD-45662, or equivalent "Calibration Systems Requirements."

**Q6. (A, B, C, D, E, F, G) BUYER SOURCE INSPECTION**

Seller conformance to Buyer requirements shall be verified by Buyer and shall be performed at Seller facilities prior to shipment of items being procured. Seller shall provide reasonable facilities and a copy of Buyer specification/drawing and the procurement document for Buyer verification of Seller conformance. Buyer reserves the right to audit/verify conformance to Buyer requirements at Seller facility and at Seller subtier supplier facilities for any item not manufactured/processed within Seller facilities. Buyer source inspection shall include, but not limited to the following:

- Validation of Seller automated test programs and procedures to Buyer specification/drawing requirements (when applicable).
- Verification of Seller performance of acceptance/qualification testing and inspections to Buyer specification/drawing requirements. Seller shall perform additional 1.0 AQL acceptance test/inspection when Seller acceptance testing has not been witnessed by the Buyer.
- Review of Seller acceptance test/inspection data and reports to verify conformance with Buyer specification/drawing requirements.
- Review of lot qualification test data to Buyer specification/drawing requirements, if applicable.
- Verification of Seller packaging and packing of items being procured to ensure conformance with Buyer procurement document or specification/drawing requirements.
- Verification of item traceability and Seller certification to ensure conformance with Buyer procurement document or specification/drawing requirements.
- Seller shall provide inspection/test data and reports to Buyer Quality Field Engineer indicating which characteristics, parameters, dimensions, etc., were actually tested/inspected for validation to Buyer specification/drawing requirements.
- Seller shall notify the Buyer not less than three working days prior to the time that items are ready for Buyer source inspection.
- After Buyer source inspection, any rework or test of the item(s), including any unscheduled or unauthorized entry, such as removal of a panel, cover, or enclosure shall void the Buyer source inspection and Seller shall request Buyer to repeat applicable source inspection step(s).

#### **A. BUYER IN-PROCESS INSPECTION**

Seller performance of in-process operations to Buyer requirements shall be verified by Buyer Quality Field Engineering during item manufacture, as specified by the procurement document.

#### **B. BUYER AUDIT/PROCESS VERIFICATION**

- Buyer audit of Seller process operations by Buyer shall include, but not be limited to, the following:
- Verification that Seller is maintaining a Quality Assurance System that has been previously approved by Buyer.
- Verification that Seller flow down of requirements to sub-tier suppliers is adequate to meet Buyer requirements.
- Verification that Seller work instructions are adequate to ensure implementation of Buyer requirements.
- Verification that Seller manufacturing processes are under control to ensure product quality, configuration control and traceability to meet Buyer requirements.
- Verification that Seller is maintaining proper control on non-conforming material and taking corrective action, as required.

#### **C. BUYER PRECAP INSPECTION**

Items of this procurement document require pre-cap inspection by Buyer subsequent to the 100 percent pre-cap visual inspection performed by Seller.

#### **D. BUYER SCANNING ELECTRON MICROSCOPE ANALYSIS**

Buyer approval of Scanning Electron Microscope (SEM) analysis shall be required for wafer lots to be incorporated in parts supplied to Buyer. The SEM analysis shall be performed by Seller and must be approved by Buyer prior to the incorporation of wafers in parts.

**(E & F deleted)**

#### **G. BUYER FINAL SOURCE INSPECTION**

Items of this procurement require final source inspection by Buyer subsequent to the 100 percent final inspection performed by Seller as required by PO.

#### **Q16. TEST DATA**

When Buyer specification requires test data to be recorded during performance of acceptance testing, a copy (paper or CD ROM disk) of the recorded data, showing evidence of Seller inspection and verification of conformance, shall accompany shipment of items to Buyer. Data shall meet the format requirements of Buyer specification and, as a minimum, be identified with:

- Buyer procurement document number and applicable change notice number.
- Buyer specification/drawing number and revision letter.
- Part number.
- Type of test performed.
- Lot number, serial numbers, and/or codes of items tested.
- Total quantity tested, quantity accepted and quantity rejected.
- Any codes, keys or other information necessary to interpret Seller data.

#### **Q18. RADIOGRAPHIC INSPECTION**

Seller must perform the radiographic inspection per the requirements in the procurement document. X-Ray facility must have the necessary equipment to evaluate the X-ray film per ASTM E 1743 & Calibrated per MIL-STD-45662 or equivalent.

Unless otherwise specified by the parts specification, each radiograph shall comply with ASTM E 1742 "Standard Practice for Radiographic Examination", MIL-STD-883 "Test Method and Procedures for Microelectronics", or MIL-STD-750 "Test Method for Semiconductor Devices." The radiographic film and a copy of the report shall accompany the shipment of the items to the Buyer. Serial number location and x-ray position must be recorded as part of or attached to the report.

#### **Q24. REQUIREMENTS FOR DISTRIBUTORS**

The distributor (a supplier other than the manufacturer) shall identify the manufacturer and location of manufacturer of each item furnished under the procurement document. When items are identified by Buyer's specification/drawing number, the distributor shall provide complete information as to the original manufacturer and original manufacturer's part number, lot number, serial number, and/or date code of items shipped. Such identification shall be submitted with each shipment.

The manufacturer must be approved for any inspection systems and/or special processes imposed by the part specification for electronic, electro-mechanical, cable and wire procurements (verified through the Buyer).

#### **Q34. (A, B, C, D, E, F) CONTROL OF SOFTWARE**

- A.** Seller shall provide and maintain a system for the control of software used in the qualification/acceptance testing of deliverable hardware, software and firmware to be furnished on this procurement. Seller shall maintain procedures and test records on items delivered to Buyer and these records shall be available for Buyer review.
- B.** Seller shall deliver documentation of software as specified in the procurement document. Software documentation shall be sufficient to establish that:
- All requirements are achieved or waivers submitted.
  - Configuration is correct and deliverables are properly identified and marked.
  - Planned level of acceptance is achieved and/or deviations/waivers are made part of the deliverable documentation package.
  - Operating instructions accompanying the developed software are sufficient to enable loading, initialization, and operation by Buyer's personnel.
- C.** Seller shall provide and maintain a software development program which is in conformance with DOD-STD-2167A, "Defense System Software Development."
- D.** Seller shall provide and maintain a software development program in accordance with requirements of DOD-STD-2167A, "Defense System Software Development," that have been tailored as specified in Buyer procurement documents.
- E.** Seller shall provide and maintain a software quality assurance program that is in conformance with DOD-STD-2168, "Defense System Software Quality Program."
- F.** Seller shall provide and maintain a software quality program that is in accordance with requirements of DOD-STD-2168, "Defense System Software Quality Program," that have been tailored as specified in Buyer procurement document.

#### **Q35. OZONE DEPLETING SUBSTANCE**

Class I Ozone Depleting Substances (ODS) shall not be used in the design, test, manufacture, integration and assembly, handling, transportation, operations, maintenance or disposal of the hardware/components delivered to this order. A certified, signed statement attesting to this shall accompany shipment and be enclosed with packing slip. Certification must contain the manufacturer's name and supplied part number. This certification may be incorporated in the certificate of conformance.

**Q36. PROHIBITED MATERIALS –** Manufacturer statement satisfying this requirement shall be documented on the manufacturers certificate of conformance.

##### **A. TIN PLATING**

The use of pure unalloyed tin is prohibited in the construction and surface finish of "goods required to be deliverable to Buyer under this Purchase Contract." Construction and finish include solders and plating. Tin is considered to be pure if it contains greater than 97% tin and less than 3% alloying elements.

##### **B. CADMIUM AND PURE ZINC**

The use of pure cadmium or pure zinc is prohibited in the construction and surface finish of space hardware. All cadmium alloys (>5% Cd by wt) or zinc alloys (>10% Zn by wt or brass >21% Zn by wt) must be completely over-plated with a Buyer-approved metal. Buyer approved overplate is minimum of 50 micro-in nickel plating, 100 micro-in copper plating, or 100 micro-in Gold plating.