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# **Strategic Deterrent Systems (SDS) Supplier Quality Assurance Requirements (SQAR) (Q Clauses)**

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**Director, Quality Mission Assurance**

## Revision/Change Record

Revision	Date	Revision/Change Description	Pages Affected
-	02/01/2021	Initial Release	All
1	06/20/2023	Major re-write of all sections for clarity and simplification	All
2	12/15/2023	Updated "SQ" prefix to "QC"; clarified wording throughout; Added requirements for red plague and white plague control for wire (QC45-D) and plating of connector pins (QC47).	All
2.1	12/15/2023	Administrative: Updated QC43 clerical error.	Pg. 22
3	03/08/2024	QC01H 1. Updated for clarity regarding certification documentation; QC39 title corrected from "Seller-provided" to "Buyer-provided"; QC43 amended to remove the requirement for manufacturer address from subclause I2 and Switched the order of sub-clause J and K, making the former J (now K) a "specifically invoked" clause; QC36, re-activated in anticipation of the eminent release of M234M; QC 46 Title updated for clarity; QC 100 title updated for clarity.	Pp. 9, 21-23, 27
4	07/08/2024	Added "applicable to QC01-H-B; reworded QC06 for clarity; QC14 set to "Reserved"; QC17 reworded for clarity and to remove Zinc and Cadmium prohibitions; QC26 simplified the title; QC28 updated to add a requirement for coupon labeling; QC 35 set to "Reserved"; QC41 clarified the title; QC43-A reworded for clarity and to make allowances for items where no batch control or serialization applies; QC 43-B moved to a new clause (QC48) and significantly reduced in scope.	Pp. 8, 11, 14, 19, 21, 22, 23, 37
5	09/04/2024	Updated the title of QC12; Updated QC17 to clarify the scope of applicability; Added QC49.	Pp. 12, 14, 26
5.1	9/10/2024	Changed language in QC39, QC47, & QC48 to promote clarity	Pp. 22, 27
6	5/14/2025	Updated QC01-A added "5 business days"; QC02-B.4 added "5 business days"; QC06 rewritten to accommodate Nadcap processors in addition to ASPL; QC20-D incorporated into QC20 by default; QC28 added "Space Addendum"; QC30 replaced RC/I with SMRR; QC35 brought back in from "Reserved" status; QC36 updated to make M234M available by request only; QC40 brought back in from "Reserved" status; QC44 set to "Reserved" status; QC46 updated to allow OEMs to use their own calibration process; QC50 added; QC100 removed "Q-clauses not invoked"	Pp. 8, 11, 12, 13, 18, 20-25, 27, 29, 30

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## 1 PURPOSE

This document defines the procurement quality requirements (Q Clauses), which may be incorporated into contractual Procurement Documents such as the Purchase Order (PO) as a supplement to any requirements levied by Northrop Grumman (NG) Strategic Deterrent Systems (SDS) Global Supply Chain (GSC).

## 2 DEFINITIONS

The following definitions are used within this document:

<i>Buyer</i>	Northrop Grumman Strategic Deterrent Systems.  <b>NOTE:</b> While some interactions may apply to various departments within Northrop Grumman SDS, only the Global Supply Chain department and the authorized buyer or sub-contract administrator is authorized to make commitments for the procurement of material and services.
<i>Commercial Item</i>	Any item, other than real property, that is of a type customarily used by the general public or by non-governmental entities for purposes other than governmental purposes, and has been sold, leased, or licensed to the general public; or has been offered for sale, lease, or license to the general public.
<i>Commercial Off the Shelf (COTS) Item</i>	Any item of supply (including construction material) that is a commercial item (as defined in the paragraph above) existing in substantial quantities in the commercial marketplace, and that is offered for sale for governmental purposes without modification and under the same requirements, specifications, terms and conditions, and standards in which it is sold in the commercial marketplace. This excludes bulk cargo, as defined in 46 U.S.C. 40102(4), such as agricultural products and petroleum products.
<i>Government-Industry Data Exchange Program (GIDEP)</i>	A cooperative activity between the United States (U.S.) Government, the Canadian Government, and Industry participants seeking to reduce or eliminate expenditures of resources by sharing technical information essential during research, design, development, production, and operational phases of the life cycle of systems, facilities, and equipment. Among other things, GIDEP is used to share information regarding suspect counterfeit material, and material with other nonconforming conditions which has been introduced into the supply chain.
<i>Independent Distributors of Electronics Association (IDEA)</i>	A non-profit trade association representing Independent Distributors that have formally committed to adhere to prescribed quality and ethical standards.
<i>Item</i>	The product or service being provided by the seller, as specified in the Procurement Document.
<i>Latent Defect</i>	A flaw or other imperfection in an item that does not become evident or active until after the item has been put into use.
<i>Procurement Document</i>	The Purchase Order (PO) or Subcontract between the Buyer and Seller.
<i>Repair</i>	An operation performed to bring a nonconforming product into a condition that meets form, fit, and function as determined by the cognizant design authority, but not into full compliance with the original requirements.

<i>Rework</i>	A documented and approved process that brings nonconforming item back into conformance with defined specifications, standards, or requirements.
<i>Seller</i>	The legal entity that is providing products and/or services and which has entered into a contractual relationship for providing products and/or services to SDS through a Procurement Document. Within the scope of this document, “supplier,” “vendor,” and “subcontractor” are considered to be synonyms of “seller.”

## 3 STANDARD QUALITY REQUIREMENTS

This section of the Supplier Quality Assurance Requirement (SQAR) manual applies to all procurements. Individual supplier quality requirements or Q-Clauses are assigned as necessary and are in addition to the requirements of this section.

### 3.1 Seller’s Responsibility for Conformance

In the event a Seller’s Responsibility for Conformance, Northrop Grumman and its customers expect our suppliers to deliver material that is 100% compliant with all the Procurement Document Requirements. If a Seller has any changes to drawings, or specifications noted on the drawing, processing, materials, or contractual requirements of the Procurement Document, a Request for Change/Information (RC/I), Form P0-F030, **shall** be initiated by the seller to request assistance. The RC/I process, and its requirements are documented in QC01-J.

### 3.2 Reserved

### 3.3 Reserved

### 3.4 Exception to Rejections

In the event a seller does not accept the responsibility for a discrepant condition, the seller **shall** initiate a letter of exception to their buyer. The letter **shall** make full reference to applicable documents and be specific in defining the area of exception.

### 3.5 Supplier Sub-tier Control

Seller **shall** ensure the following:

- All items procured from its subcontractors conform to all requirements of the Buyer’s purchase order.
- All provisions of this document that have been incorporated into the Procurement Document are flowed to its subcontractors, including copies of the latest revision process specifications.
- For Special Processes Procurement Documents “Northrop Grumman Strategic Deterrent Systems (SDS)” is cited as the customer and the Program identification (such as B-2) and the latest process specification revisions are included in the Procurement Document.

### 3.6 Shared Suppliers

Northrop Grumman SDS accepts other Northrop Grumman Corporation (NGC) Sectors delegated source / Supplier Self Inspection programs for shared suppliers. Northrop Grumman and its customers retain the right to impose inspection requirements independent of the supplier’s Delegated Source authority.

**NOTE:** Delegated Suppliers are not exempt from audits and on-site verification of corrective action. Material currently undergoing corrective action investigation processing up to and including verification of corrective action **shall** not be shipped without the authorization of the Buyer’s Supplier Mission Assurance (SMA) department.

## 4 SUPPLIER QUALITY ASSURANCE REQUIREMENTS (Q CLAUSES)

See Q-Clauses QC01 through QC50, QC99, and QC100 below:

## QC01 GENERAL QUALITY ASSURANCE REQUIREMENTS

**Guidance:** A through J **shall** apply when design actions or build to print are being procured. For all other purchases, where QC01 is required, SMA will assign individual Sub-clauses as necessary.

## A. Material Review Board (MRB) and Reporting Requirements

1. **MRB Authority:** Seller is not authorized to process MRB dispositions of "Repair" or "Use-As-Is" for any item 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 MRB authorization has been granted by Northrop Grumman in writing. To request Use-as-is and Repair dispositions, Seller **shall** fill out Supplier Material Review Report (SMRR) form Q0-F019 in Oasis. (<https://www.northropgrumman.com/Suppliers/Contracts/Forms>)
2. **Change in Approval, Drawing, Processes, Materials, or Procedures:** Seller **shall** not change any drawing, process, material (including sub-tier supplier parts), or procedure without prior Buyer's written approval, where such drawing, process, material, or procedure was used to qualify items which were used by Seller to become a qualified source.
3. **Notification of Facility Change:** Seller **shall** notify Buyer within 5 business days of any change/relocation in production, manufacturing, testing, and/or processing facilities or manufacturing processes that differ from facilities and processes previously approved by Buyer without first notifying Buyer and affording Buyer an opportunity to examine and approve such facilities for compliance with procurement quality requirements.
4. **Product Escapes:** Seller **shall** notify buyer within 5 business days of nonconformances, or suspected nonconformances found by Seller or sub-tier suppliers after the time of product delivery.
5. **Change in Quality Management System (QMS) status:** Seller **shall** not make a significant change in QMS certification status without notifying the Buyer, including involuntary changes such as the loss of QMS certification. Seller **shall** notify buyer within 5 business days of any major nonconformances issued during audits conducted by external sources.
6. **Change of Management/Owner:** Seller **shall** notify Buyer within 5 business days in the event of a change in management or ownership.

## B. Sub-Tier Supplier Management

1. Seller **shall** manage sub-tier suppliers to mitigate the risk of nonconformances using a management system that includes, at a minimum, the following:
  - a. Contractual requirements flow-down
  - b. Sub-tier supplier pre-award survey/evaluations
  - c. Periodic auditing of supplier
  - d. Supplier rating system
  - e. Inspection of procured items to documented procedures.
  - f. Control of nonconforming material, including corrective action.

## C. Buyer Survey, Surveillance, Audits, and Inspection

1. Buyer or Buyer's representative, as well as their customers and regulatory authorities **shall** have the right of access to conduct surveys, audits, and surveillance of Seller facilities involved in the production of purchased items, and the facilities of the Seller's sub-tier suppliers with prior coordination with Seller.

## D. Supplier Corrective Action Request

1. When the Buyer becomes aware of a nonconformance within the Seller's Quality Management System or with Seller's product(s), the Buyer may issue a Supplier Corrective Action Request (SCAR).
2. Responses to SCARs **shall** be timely and **shall** include the following information:
  - a. Root cause of the deficiency.
  - b. Action taken to correct the specific deficiency.
  - c. Action taken to prevent recurrence of similar deficiencies.
  - d. Action taken to determine if other products are similarly affected.
  - e. Effectivity date for implementation of identified corrective and preventive actions.
  - f. Verification that the corrective and preventive actions are effective.

## E. U.S. Government Source Inspection

1. For procurements made under U.S. Government contracts, the U.S. Government **shall** have the right to inspect any and all of the work contracted through the Procurement Document, at Seller's facilities or at sub-tier supplier's facilities.

## F. Nonconforming Materials

1. Upon discovery, nonconforming material must be identified and documented, segregated, or bonded, pending disposition, in order to prevent its unintended release or use.
2. The Seller **shall** evaluate nonconforming material to determine the actions necessary to contain its effect on other processes or products.

## G. Inspection Records

1. Seller **shall** maintain records of all inspections and tests performed on any item delivered to the Buyer.
2. Records **shall** identify any nonconformance(s) and **shall** be made available for review by the Buyer, the Buyer's customer, and any applicable regulatory authorities.

## H. Seller's Certification Documentation

1. The certification documentation may come from the manufacturer(s), intermediaries, the Seller, or any combination thereof. The package of documentation may also consist of multiple documents with various titles such as Certificate of Conformance or Packing List but **shall** collectively include the following information:
  - a. Procurement Document (PO) and Line Item Number
  - b. Applicable identifying nomenclature/traceability such as Item Name, Part Number, Revision, Serial Numbers, Batch Numbers, etc.
  - c. Quantity shipped
  - d. Conformance Statement: "The items furnished per Buyer's 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” (or similar wording).

- e. Approval by the Seller’s duly authorized representative.
  - f. If a Request for Change/Information (RC/I) was submitted and dispositioned, add the RC/I number(s) to the certification documentation or provide a copy of the RC/I(s) with the shipment.
2. If the Seller is a distributor (supplier other than the Manufacturer of an item) the Seller **shall** provide evidence of material authenticity (chain of custody) back to the Original Equipment Manufacturer or Authorized Aftermarket Manufacturer. The Certification **shall** clearly identify the name and location of all of the supply chain intermediaries from the original manufacturer to the Seller.

## I. Cancelled or Superseded Specifications

- 1. Cancelled or superseded military specifications that are called out on legacy Northrop Grumman engineering drawings and drawings with Northrop Grumman acquired design cognizance, **shall** be certified to the latest or superseding specifications, and provided there is a clear linkage via Department of Defense Index of Specification and Standards (DODISS) website.  
**NOTE:** Sellers are cautioned to verify the “Cancellation Notice is still in affect” because certain cancelled military specifications have been reinstated in recent years.
- 2. Processing to cancelled specifications is allowed when the “Cancellation Notice” does not provide a clear direction for a superseding specification or as directed by the cognizant Materials and Processes (M&P) Engineering.”

## J. Request for Change/Information

- 1. Seller **shall** utilize the RC/I process to request clarification or change of a drawing or specification requirement.
- 2. Access to this form **shall** be requested by Seller.

**NOTE:** Fill out the **RC/I Form P0-F030** found at the Oasis website:  
<https://www.northropgrumman.com/suppliers/contracts/forms>

## QC02 BUYER INSPECTION/SURVEILLANCE

**Guidance:** SMA to select only one of the three Sub-clauses A, B, or C.

Verification activities performed by the Buyer or Buyer’s customer at any level in the Seller’s supply chain, such as the activities mentioned below, **shall** not be used by the Seller as evidence of effective control of quality and does not absolve the organization of its responsibility to provide acceptable product and comply with all requirements.

### A. Source Inspection

- 1. Seller **shall** provide notification, access, and reasonable inspection facilities at the seller’s site which are necessary for the Buyer (or representative) to verify conformance to requirements for purchased items, prior to the delivery of those items to the Buyer.
- 2. After Buyer’s Source Inspection, any rework or test of the item, including any nonscheduled entry, such as removal of a panel, cover, or enclosure **shall** void the source inspection.

3. Seller **shall** notify Buyer a minimum of seven (7) workdays prior to commencement of these activities by any convenient means to allow for arrangements for Buyer and/or Buyer's quality representative to be present for source inspection.

## B. Buyer In-Process Inspection

1. Buyer **shall** designate required in-process source inspection points and inform Seller in writing.
2. Seller **shall** provide notification, access, and reasonable inspection facilities at the seller's site which are necessary for the Buyer (or representative) to verify conformance to requirements for in-process items, prior to advancing those items to the next stage of production.
3. After Buyer's in-process inspection, any rework or test of the item, including any nonscheduled entry, such as removal of a panel, cover, or enclosure **shall** void the Buyer's inspection.
4. Seller **shall** notify Buyer at a minimum of 5 business days prior to the time in-process inspection coverage is required.

## C. Electronic Source Inspection

1. Seller **shall** provide electronic source inspection materials consisting of photos and other necessary documents sent to Buyer via electronic media such that the Buyer can perform source inspection remotely. When QC07 applies, test data **shall** also be sent electronically.
2. Buyer **shall** review the provided information and, if it is found to be acceptable, **shall** provide authorization to ship.

## QC03 RESERVED

## QC04 UNITED STATES GOVERNMENT SOURCE INSPECTION (DEPARTMENT OF DEFENSE)

**Guidance:** All Sub-clauses apply when QC04 is required.

- A. Seller **shall** provide notification, access, and reasonable inspection facilities at the seller's site which are necessary for the Department of Defense (DoD) Quality Assurance representative to verify conformance to requirements for purchased items, prior to the delivery of those items to the Buyer.
- B. After the DoD Source Inspection, any rework or test of the item, including any nonscheduled entry, such as removal of a panel, cover, or enclosure **shall** void the source inspection.
- C. If specific Mandatory Government Inspection (MGI) points have been communicated, the DoD Quality Assurance representative **shall** be notified at a minimum of three (3) workdays prior to commencement of these activities to allow for arrangements for the DoD Quality Assurance representative to be present for the inspection.
- D. If the DoD Quality Assurance representative cannot be reached, the Seller **shall** inform the Buyer immediately.

**NOTE:** The Department of Defense includes but is not limited to the following branches and agencies: Army, Navy, Air Force, Marines, Space Force, and Defense Contract Management Agency (DCMA).

**QC05 RAW MATERIAL DOCUMENTATION REQUIREMENTS**

**Guidance:** SMA to select either A or B as needed, when QC05 is required.

- A. Shipment of materials, whether raw, semi-finished, or finished, **shall** be accompanied by a Certificate of Conformance from Seller, stating at a minimum:
  - 1. Material identification by specification number and material conditions, where applicable.
  - 2. The raw material manufacturer's (or mill's) lot or batch number.
  - 3. The name and location of the raw material manufacturer or mill.
  - 4. A statement of raw material conformance to applicable requirements.
- B. All items defined in QC05-A with the addition of actual chemical/physical test results that substantiate compliance with the applicable raw material and/or specification requirements **shall** be provided.

**QC06 CONTROL OF SPECIAL PROCESSES**

**Guidance:** All Sub-clauses apply when QC06 is required.

- A. A Special Process is any process where the resulting output cannot be verified by subsequent monitoring or measurement; or which could change an item's material elements or physical integrity from time of material acquisition to product delivery. Process specifications called out in engineering drawings, other process specifications, or purchase orders are defined as a special process when the process specification(s) are listed on the Northrop Grumman Strategic Deterrent Systems (SDS) Approved Special Processor List (ASPL) at the time of purchase order release. Special processors and the special processes to which they are approved for are listed on the SDS ASPL and can be found at <https://oasis-aspl.myngc.com> by selecting the Sector "Strategic Deterrent Systems."
- B. To request an addition to the SDS ASPL of a non-Nadcap-approved processor, the Seller **shall** submit either:
  - 1. A completed Q145F01 to the Buyer which can be found at: <https://www.northropgrumman.com/suppliers/contracts/quality-documents> OR
  - 2. A request to Buyer through any convenient means that includes the company name, address, special process specification, special process description, limitations (if any), and contact information for point of contact in the quality organization at the special processor.

**NOTE:** The Buyer will perform an audit at the requested company to determine their suitability for being added to the SDS ASPL.

- C. Prior to processing each lot of hardware, the Seller **shall** ensure that the processing source performing the work, including the case where the Seller performs the process themselves, is either
  - 1. Listed on the SDS ASPL for the applicable process OR
  - 2. Currently Nadcap approved for that process
- D. For Nadcap approved processors not on the SDS ASPL, the Seller **shall** provide objective evidence that the special processor was Nadcap approved for the process at the time of performing the special process.
- E. Buyer approval and/or Nadcap approval of special processors **shall** not relieve Seller of responsibility for exercising the control measures necessary to ensure delivered items conform to the requirements of the Procurement Document.

**QC07 TEST DATA**

**Guidance:** All Sub-clauses apply when QC07 is required.

- A. Seller **shall** submit with each shipment a copy of their test data relating to purchased items.
- B. Data on the test report **shall** include at a minimum:
  - 1. Buyer's Procurement Document number and change notice number.
  - 2. Part number
  - 3. Lot numbers, serial numbers, or date codes of items tested.
  - 4. Drawing/specification and revision used and drawing note/callout number.
  - 5. Type of test performed.
  - 6. Identification number of test equipment used.
  - 7. Total quantity of items tested, quantity of items accepted, and quantity of items rejected.
  - 8. Any codes, keys, or other information necessary to interpret Seller data.

**QC08 RADIOGRAPHIC / COMPUTER TOMOGRAPHY INSPECTION**

**Guidance:** All Sub-clauses apply when QC08 is required. Exclusion of A or B is acceptable based on inspection method.

- A. Unless otherwise specified by the parts specification, radiographic inspection **shall** comply with ASTM E1742, "Radiographic Examination," and where applicable, MIL-STD-883, "Test Procedures for Microelectronics," and MIL-STD-750, "Test Methods for Semiconductor Devices."
- B. Unless otherwise specified by the parts specification, computer tomography inspection **shall** comply with ASTM E1441, "Standard Guide for Computer Tomography."
- C. A copy of the inspection report **shall** accompany the shipment of the items to Buyer.
- D. The radiographic film or digital images **shall** be retained by the Seller for a minimum of seven (7) years and made available to the Buyer upon request.

**QC09 RESERVED****QC10 SELLER INSPECTION REPORTING REQUIREMENTS**

**Guidance:** All Sub-clauses apply when QC10 is required.

- A. Seller **shall** submit, with each shipment of items, one copy of an inspection report reflecting any inspections performed for the purpose of validating the conformity of purchased items.
- B. Inspection record traceability **shall** be maintained by either serializing each inspected item or by tag identification.

**QC11 SELLER'S CALIBRATION SYSTEM REQUIREMENTS**

**Guidance:** All Sub-clauses apply when QC11 is required.

- A. Seller **shall** be responsible for the calibration, accuracy, validation, and maintenance of any equipment, tooling, or gauges utilized by Seller to produce, inspect, or test articles to be delivered under this Procurement Document.
- B. Seller's equipment calibration system **shall** be in accordance with one of the standards listed below:
  - 1. ANSI/NCSL Z540.3, Requirements for the Calibration of Measuring and Test Equipment, or
  - 2. ISO/IEC 17025, General Requirements for the Competence of Testing and Calibration Laboratories

**QC12 CONTROL OF CUSTOM SOFTWARE**

**Guidance:** All Sub-clauses apply when QC12 is required.

- A. Software Quality Program
  - 1. Seller **shall** establish a Software Quality Assurance Program that conforms to one of the standards specified below, and is subject to Buyer review and approval:
    - a. AS9100, Quality Management Systems – Requirements for Aviation, Space, and Defense Organizations
    - b. AS9115, Requirements for Aviation, Space and Defense Organizations – Deliverable Software
    - c. ISO/IEC 12207, Software Life Cycle Processes
    - d. Capability Maturity Model Integration (CMMI) – Level 3 or higher, or
    - e. Federal Aviation Administration DO-178 – Software Considerations in Airborne Systems and Equipment Certification.
- B. Software Delivery Documentation
  - 1. Seller **shall** deliver software documentation sufficient to ensure that:
    - a. All requirements are achieved or are covered by approved waivers.
    - b. Configuration is correct and deliverables are properly identified and marked.
    - c. Planned software testing was performed and achieved passing results.
    - d. Operating instructions accompanying the developed software are sufficient to enable loading, initialization, and operation by Seller's personnel.
- C. Software Control
  - 1. Seller **shall** provide and maintain a system for the control of software used in the fabrication, qualification/acceptance testing of deliverable hardware, software, and firmware to be furnished for this procurement.
  - 2. Seller **shall** maintain procedures and test records for items delivered to Buyer and these records **shall** be available for Buyer review.

**QC13 ELECTROSTATIC DISCHARGE CONTROL**

**Guidance:** All Sub-clauses apply when QC13 is required.

- A. Seller **shall** provide and maintain a program for Electrostatic Discharge (ESD) control for hardware items to be furnished for this procurement in accordance with ANSI-S20.20, Protection of Electrical and Electronic Parts, Assemblies, and Equipment, (excluding Electrically Initiated Explosive Devices), for the Development of an Electrostatic Discharge Control Program.
- B. Seller's ESD control program **shall** be subject to review and approval by Buyer.
- C. Electrostatic Discharge sensitive items **shall** be packaged in accordance with ANSI/ESD S541-2019, Packaging Materials for the Protection of Electrostatic Discharge Susceptible Items.

**QC14 RESERVED****QC15 RESERVED****QC16 RESERVED****QC17 PURE TIN PROHIBITION**

- A. For MIL-STD-11991, General Standard for Parts, Materials, and Processes: compliant part numbers, any tin finish containing less than 3% by weight lead OR any tin alloy containing silver as an intentional alloying element is prohibited.
- B. In such cases, the seller **shall** submit evidence with each shipment indicating that no prohibited tin finishes are present in the delivered materials or indicating the part's compliance to MIL-STD-11991, General Standard for Parts, Materials, and Processes. This evidence may exist in one of several formats including Certificate of Analysis, Certificate of Conformance, markings on the part packaging, etc.

**QC18 BALL AND ROLLER BEARINGS**

**Guidance:** All Sub-clauses apply when QC18 is required.

- A. Each ball bearing and roller bearing delivered under this contract **shall** be manufactured in the United States, its outlying areas, or Canada.
- B. For each ball bearing or roller bearing, the cost of the bearing components manufactured in the United States, its outlying areas, or Canada **shall** exceed 50 percent of the total cost of the bearing components of that ball bearing or roller bearing.

**QC19 QUALITY MANAGEMENT SYSTEM**

**Guidance:** SMA to select no more than one of A, B, C, D, I, M, N, O and P; no more than one of E, F, and G; no more than one of J, K, and L; no more of one of Q and R; no more than one of S and T; as applicable.

- A. ISO9001 Compliant
  - 1. Seller **shall** deploy and maintain a Quality Management System that is compliant to ISO9001.

2. Seller agrees to provide reasonable access and cooperation to allow the Buyer, or Buyer's representative, to perform audit activities as necessary to validate the compliance of the Seller's Quality Management System.

**B. ISO9001 Registered**

1. Seller **shall** deploy and maintain a Quality Management System that is certified to ISO9001 by an accredited certification body.

**C. AS9100 Compliant**

1. Seller **shall** deploy and maintain a Quality Management System that is compliant to AS9100.
2. Seller agrees to provide reasonable access and cooperation to allow the Buyer, or Buyer's representative, to perform audit activities as necessary to validate the compliance of the Seller's Quality Management System.

**D. AS9100 Registered**

1. Seller **shall** deploy and maintain a Quality Management System that is certified to AS9100 by an accredited certification body.

**E. Capability Maturity Model Integration for Development (CMMI-DE-) – Level 3**

1. Seller **shall** deploy and maintain a Quality Management System that has been assessed at a maturity level of at least Level 3 by an assessor accredited by the CMMI Institute.

**F. Capability Maturity Model Integration for Development (CMMI-DE-) – Level 4**

1. Seller **shall** deploy and maintain a Quality Management System that has been assessed at a maturity level of at least Level 4 by an assessor accredited by the CMMI Institute. Capability Maturity Model Integration for Development (CMMI-DE-) – Level 5

**G. Capability Maturity Model Integration for Development (CMMI-DE-) – Level 5**

1. Seller **shall** deploy and maintain a Quality Management System that has been assessed at a maturity level of at least Level 5 by an assessor accredited by the CMMI Institute.

**H. Reserved**

**I. Quality Management System**

1. Seller **shall** have a formalized Quality Management System.
2. Seller agrees to provide reasonable access and cooperation to allow the Buyer, or Buyer's representative, to perform audit activities as necessary to assess the adequacy of the Seller's Quality Management for the purchased items.

**J. Capability Maturity Model for Integration (CMMI-SV) for Services – Level 3**

1. Seller **shall** deploy and maintain a Quality Management System that has been assessed at a maturity level of at least Level 3 by an assessor accredited by the CMMI Institute.

**K. Capability Maturity Model for Integration (CMMI-SV) for Services – Level 4**

1. Seller **shall** deploy and maintain a Quality Management System that has been assessed at a maturity level of at least Level 4 by an assessor accredited by the CMMI Institute.

**L. Capability Maturity Model for Integration (CMMI-SV) for Services – Level 5**

1. Seller **shall** deploy and maintain a Quality Management System that has been assessed at a maturity level of at least Level 5 by an assessor accredited by the CMMI Institute.

M. AS9110 Compliant

1. Seller **shall** deploy and maintain a Quality Management System that is compliant to AS9110, Quality Management Systems – Requirements for Aviation Maintenance Organizations.
2. Seller agrees to provide reasonable access and cooperation to allow the Buyer, or Buyer's representative, to perform audit activities as necessary to validate the compliance of the Seller's Quality Management System.

N. AS9110 Registered

1. Seller **shall** deploy and maintain a Quality Management System that is certified to AS9110 by an accredited certification body.

O. AS9120 Compliant

1. Seller **shall** deploy and maintain a Quality Management System that is compliant to AS9120, Quality Management Systems – Aerospace Requirements for Stockist Distributors.
2. Seller agrees to provide reasonable access and cooperation to allow the Buyer, or Buyer's representative, to perform audit activities as necessary to validate the compliance of the Seller's Quality Management System. AS9120 Registered.

- P. Seller **shall** deploy and maintain a Quality Management System that is certified to AS9120 by an accredited certification body.

Q. ISO 20000 Compliant

1. Seller **shall** deploy and maintain a Quality Management System that is compliant to ISO 20000, The International Standard for Service Management.
2. Seller agrees to provide reasonable access and cooperation to allow the Buyer, or Buyer's representative, to perform audit activities as necessary to validate the compliance of the Seller's Quality Management System. ISO 20000 Registered.

- R. Seller **shall** deploy and maintain a Quality Management System that is certified to ISO 20000 by an accredited certification body.

S. Information Technology Infrastructure Library (ITIL) Compliant

1. Seller **shall** deploy and maintain an Information Technology (IT) Service Management System that is compliant to ITIL.
2. Seller agrees to provide reasonable access and cooperation to allow the Buyer, or Buyer's representative, to perform audit activities as necessary to validate the compliance of the Seller's Quality Management System. ITIL Certified.

- T. Seller **shall** deploy and maintain an IT Service Management System that is certified to ITIL by the applicable accreditation body.

## QC20 FIRST ARTICLE INSPECTION

**Guidance:** All Sub-clauses apply when QC20 is required.



- A. The seller **shall** perform First Article Inspection (FAI) in accordance with AS9102, Aerospace Series – First Article Inspection Report, on new product representative of the first production run to verify that the production processes, production documentation, and tooling have the capability to produce products that meet established requirements.
- B. For assemblies, the assembly level FAI **shall** be performed on those characteristics specified on the assembly drawing or model.
- C. This process **shall** be repeated when changes occur that invalidate the original results (e.g., engineering changes, manufacturing process changes, tooling changes).
- D. The Seller **shall** notify the Buyer of the opportunity to witness the performance of First Article Inspection/Testing with at least five (5) business days of advanced notice.

## QC21 RESERVED

## QC22 CONTAMINATION / FOREIGN OBJECT DEBRIS AND TOOL CONTROL

**Guidance:** All Sub-clauses apply when QC22 is required.

- A. The Seller **shall** maintain a Foreign Object Debris (FOD) prevention program, including tool control, and this program **shall** be applied to the production of the items to be provided to the Buyer.
- B. The Seller's FOD prevention program **shall** include the review of design and manufacturing processes to identify and eliminate foreign object entrapment areas and paths through which foreign objects can migrate.
- C. The Seller's Tool Control program **shall** include identification, inventory, and location control to reduce the risk of tools lost within the items to be provided to the Buyer.
- D. Buyer **shall** have the right to perform inspections, verifications, tool control, and FOD prevention program audits at Seller's facility to ensure program documentation and effectiveness.

## QC23 UNIQUE IDENTIFICATION

**Guidance:** A and B always apply when QC23 is required. C and D only apply individually if they are explicitly invoked.

- A. Defense Federal Acquisition Regulation Supplement (DFARS) clause 252.211-7003, Item Identification and Valuation **shall** be applied.
- B. Unique Identification (UID) **shall** be in compliance with MIL-STD-130, Identification Marking of U.S. Military Property (latest revision).
- C. Each individual Matrix (2-D barcode) **shall** be verified to meet at least a grade B criteria for electro-optical scanning and legibility of the UID and evidence of each verification **shall** be supplied by the Seller.
- D. Certification of Registration for individual UID-applicable items **shall** accompany shipment, validating traceability into the U.S. Government web database. For additional details, refer to the Defense Acquisition University website, ([www.dau.edu](http://www.dau.edu)) or click on the link below:

[Item Unique Identification \(IUID\) Toolbox](#)

**QC24 CIRCUIT CARD ASSEMBLY SOLDER WORKMANSHIP STANDARD**

- A. Soldering and processing of electronic assemblies **shall** be in accordance or equivalent with Class 3 of IPC-A-610 "Acceptability of Electronic Assemblies" or Class 3 of J-STD-001 "Requirements for Soldered Electrical and Electronic Assemblies."
- B. Where indicated by the drawing, electrical connections **shall** conform to J-STD-001 Space Addendum.

**QC25 SOLDERABILITY**

**Guidance:** All Sub-clauses apply when QC25 is required.

- A. Material submitted with each shipment **shall** have had solderability testing performed in accordance with one or more of the following specifications:
  - 1. MIL-STD-750, Method 2026, Test Methods for Semiconductor Devices
  - 2. MIL-STD-883, Method 2003, Mechanical Test Methods for Microcircuits Part 2: Test Methods 2000-2999
  - 3. MIL-STD-202, Method 208, Solderability
  - 4. MIL-PRF-55110, General Specification for Printed Wiring Board, Rigid
  - 5. J-STD-001, Requirements for Soldered Electrical and Electronic Assemblies
  - 6. J-STD-002, Solderability Tests for Component Leads, Terminations, Lugs, Terminals, and Wire
  - 7. J-STD-003, Solderability Tests for Printed Boards
- B. Seller **shall** supply a copy of the certification by an accredited agency to one or more of the specifications listed in article A with each order.
- C. If, during the life of that Procurement Document, the certification is revoked or the certification expires, the Buyer **shall** be notified in writing within 24-hours.

**QC26 CUSTOMER FURNISHED PROPERTY**

**Guidance:** All Sub-clauses apply when QC26 is required.

- A. Materials furnished to Seller, by Buyer, **shall** require accountability by Seller.
- B. Materials **shall** be stored and handled in such a manner to ensure the integrity of the material is maintained.
- C. Seller **shall** obtain direction from Buyer concerning the disposition of rejected and/or unused quantities, or usable trimming remaining at the end of the procurement activity.
- D. Seller **shall** be responsible for maintaining records of identity and the assurance of continued suitability of the material, tooling, test equipment, etc., while such items are in their possession.
- E. Return of any equipment or left-over material at the end of the procurement activity **shall** be arranged through Buyer.

**QC27 CABLE/HARNESS WORKMANSHIP STANDARD**

**Guidance:** All Sub-clauses apply when QC27 is required.

- A. Workmanship **shall** be in accordance with Class 3 of the IPC/WHMA-A-620, "Requirements and Acceptance for Cable and Wire Harness Assemblies."
- B. Where indicated by the drawing, Cable and Harnesses **shall** conform to IPC/WHMA-A-620-S, "Space and Military Applications Electronics Hardware Addendum to IPC/WHMA-A-620."

**QC28 PRINTED WIRING BOARD**

**Guidance:** All Sub-clauses apply when QC28 is required.

- A. Printed Wiring Boards fabricated under this Procurement Document **shall** comply with the requirements of IPC-A-600, "Acceptability of Printed Boards," IPC-6011, "Generic Performance of Printed Boards," and IPC-6012, "Qualification and Performance Specification for Rigid Printed Boards." Where indicated by the drawing, Printed Wiring Boards **shall** conform to "Space and Military Avionics Addendum to IPC-6012, Qualification and Performance Specification for Rigid Printed Boards."
- B. If coupons are defined on the drawing, the Seller **shall** include them with each shipment and **shall** be labeled to ensure traceability back to the material which they represent.
- C. The use of lead-free solder alloys is not acceptable unless explicitly required by the drawing or applicable specifications.

**QC29 TEST COUPON**

- A. Test coupons, prepared in accordance with applicable specifications, **shall** be provided with each shipment and **shall** be labeled to ensure traceability back to the material which they represent.

**QC30 PRINTED WIRING BOARD TESTING**

**Guidance:** All Sub-clauses apply when QC30 is required.

- A. Unless otherwise specified in the Engineering Requirements Documentation, the Seller **shall** perform bare board testing with these values: Test voltage -10-250V, continuity -10 ohm maximum, insulation resistance -10K ohm minimum.
  - 1. Acceptable boards **shall** be acceptance stamped.
  - 2. Rejected boards **shall** be identified with the from/to path of failure and annotated either short or open.
- B. Seller **shall** not repair without prior authorization from the Buyer. Authorization **shall** be requested using the Supplier Material Review Report (SMRR) process (form Q0-F019) which is found on the OASIS Supplier Portal ([Forms - Northrop Grumman](#)).
- C. For boards with four or more layers, automated electro-optical inspection **shall** be required.

## QC31 RESERVED

## QC32 RESERVED

## QC33 DROP SHIP

**Guidance:** All Sub-clauses apply when QC33 is required.

- A. Seller **shall** deliver parts/material to the address identified on the Purchase Order.
- B. A copy of all required documentation **shall** be provided to Buyer for review and approval prior to the delivery of items to the drop-ship location.

## QC34 END ITEM DATA PACKAGE

**Guidance:** All Sub-clauses apply when QC34 is required.

- A. An End Item Data Package (EIDP) **shall** be developed, maintained, and provided, which incorporates the following information, as applicable:
  - 1. Seller Certificate of Conformance (refer to section H of QC01)
  - 2. Specification/drawing number and revision
  - 3. As-built configuration (Indentured Parts List).
 

**NOTE:** Not required for software.
  - 4. Proof of traceability requirements compliance (serial numbers, lot numbers, batch number, software version, material certifications, etc.)
  - 5. Documented nonconformances.
  - 6. Documented open action items.
  - 7. Incorporated Change Orders (Engineering Change Proposals (ECPs)).
  - 8. Certificate of Conformances from sub-tier suppliers.
  - 9. Records of inspection results including quantities tested and accepted.
  - 10. Records of test results including quantities tested and accepted.
  - 11. Applicable GIDEP alerts, waivers, deviations, and incident reports
  - 12. Verification of compliance with useful life requirements, e.g., total operating time, thermal cycles, vibration time.
  - 13. Nuclear Hardness Cert / Test Data
  - 14. First Article Inspection (FAI) / Delta FAI
  - 15. Any applicable RC/Is

- B. Documentation **shall** include Buyer's source inspection if such source inspection is performed.
- C. Seller **shall** obtain written approval from the Buyer for any deviations to the content of the EIDP using the RC/I process.

**NOTE:** Fill out the **RC/I Form P0-F030** found at the Oasis website:  
<https://www.northropgrumman.com/suppliers/contracts/forms>

## QC35 MANUFACTURING PLAN SUBMITTALS FOR CRITICAL AND DESIGNATED PARTS

**Guidance:** All Sub-clauses apply when QC35 is required.

- A. The Seller **shall** submit a manufacturing plan to Northrop Grumman at least thirty (30) days prior to start of production using the RC/I form. The manufacturing plan **shall** contain sequential fabrication, processing, processor name and inspection steps in the order required by the applicable process specification(s) and/or engineering drawing(s).

**NOTE:** Fill out the **RC/I Form P0-F030** found at the Oasis website:  
<https://www.northropgrumman.com/suppliers/contracts/forms>

- B. Upon approval of supplier's manufacturing plan, the Seller **shall** control all manufacturing, processing, testing and inspections as stated in the approved plan. No deviations, including the selection of supplier's sub-tier suppliers/processors, is permitted without Northrop Grumman prior knowledge and written authorization.

**NOTE:** Manufacturing plans can be approved without Non-Destructive Testing (NDT) technique approval and manufacturing of parts is allowed up to a point for NDT.

## QC36 SPECIAL TOOLING AND SPECIAL TEST EQUIPMENT

**Guidance:** All Sub-clauses apply when QC36 is required.

- A. The Seller **shall** fabricate all Special Tooling (ST) and Special Test Equipment (STE) in accordance with the Buyer's Supplier Tooling Manual (M234M). These requirements are applicable to all ST and STE fabricated and/or used in the manufacture of deliverable end items, unless specifically stated otherwise on the purchase order. The Seller **shall** also flow these requirements to any of their sub-tier suppliers that fabricate or design tooling on their behalf.

**NOTE:** The Seller may request a copy of this document from the Buyer.

- B. Inspection tooling **shall** be controlled as part of the Seller's Calibration system prior to use in production. Periodic tool inspection detailed requirements are covered in the Buyer's Supplier Tooling Manual. (M234M)

## QC37 QUALIFIED DIES AND TOOLING FOR CASTINGS AND FORGINGS

- A. The Seller **shall** qualify each piece of Casting/Forging dies and tooling used in the manufacture of castings or forgings for the Buyer in accordance with applicable material specifications as called out on the engineering drawing.

1. The Seller **shall** conduct dimensional qualification by performing an AS9102-compliant First Article Inspection on all product features that are controlled by the casting/forging dies and tooling.
2. The Seller **shall** submit the First Article Inspection results to the applicable Buyer Engineer for review and approval.
3. The Seller **shall** withhold delivery of items pending, Buyer approval of the dies and tooling qualification First Article Inspection results.

## QC38 RESERVED

## QC39 CALIBRATION OF BUYER-PROVIDED MEASUREMENT AND TEST EQUIPMENT

**Guidance:** All Sub-clauses apply when QC39 is required.

- A. The calibration **shall** be performed under a current third-party accreditation to one of the following standards:
1. ISO/IEC 17025, General Requirements for the Competence of Testing and Calibration Laboratories, or
  2. ANSI/NCSL Z540.3, Requirements for the Calibration
- NOTE:** It is expected that the Seller will transition from ANSI Z540.3 to ISO17025 at the next recertification event.
- B. The Seller **shall** provide a certificate of calibration to include, at a minimum, the following information:
1. Data results from the event.
  2. As-found condition (e.g., in / Out of Tolerance (OOT), limited/special).
  3. Any actions taken.
  4. As-left condition (e.g., in/OOT, limited/special).
  5. An indication that calibrations were performed in accordance with ISO/IEC 17025 or ANSI Z540-3.

## QC40 COUNTERFEIT PREVENTION FOR NON-EEE PART SUPPLIERS AND DISTRIBUTORS

**Guidance:** All Sub-clauses apply when QC40 is required.

- A. **Seller Quality Management System / Approved Supplier Requirements:**
1. All material delivered under the Buyer's Authorized Purchase Order **shall** be authentic and traceable to the original manufacturer or authorized distributor for finished parts and assemblies, or to the mill/plant for raw materials. If documented acquisition traceability is not available, Seller **shall not** accept the Purchase Order unless the Seller requests and receives Buyer authorization to validate the authenticity of material according to the Buyer's requirements.
  2. Seller **shall** have and implement effective counterfeit parts/material prevention processes that:
    - a. are in accordance with AS6174.
    - b. define the processes used for assuring that only authentic and conforming parts/material are procured.
    - c. define the processes to be used for reporting in the event any counterfeit material is encountered in its supply chain.
  3. The Counterfeit Prevention Plan is subject to Buyer approval and may be disapproved at any time if the Seller fails to provide for an appropriate level of assurance for procuring authentic material.
    - a. The Seller **shall** impose appropriate requirements on all tiers of its supply chain to ensure that the substance of these requirements and the Buyer's Authorized Purchase Order are met.

- b. Seller **shall** ensure that all occurrences where it has acquired and/or provided suspect counterfeit parts/material are reported as appropriate to customers and GIDEP

## **B. Buyer Audit and Surveillance Program Requirements:**

1. Buyer reserves the right to conduct periodic audits of Seller's Counterfeit Material Protection Plan/processes and associated records. Seller **shall** make available to the Buyer pertinent records as necessary for the Buyer to conduct audit(s). Record retention will be the responsibility of the Seller.
2. The Seller **shall** ensure that Buyer and Buyer's Customers have access to the Seller's facilities and the facilities of its supply chain at all tiers, in order to verify compliance to Buyer's requirements.

## **C. Material Authenticity Validation Requirements:**

1. If Buyer authorizes the Seller to provide material without traceability, the Seller **shall** perform all necessary material authenticity validation tests as documented in AS6174. The Seller **shall** seek and receive approval from the Buyer for all Material Authenticity Validation tests in advance using the RC/I process.
2. Authenticity Validation Test results **shall** be provided to the Seller with any delivered items that were verified using Authenticity Verification Testing.

**NOTE:** Fill out the **RC/I Form P0-F030** found at the Oasis website:

<https://www.northropgrumman.com/suppliers/contracts/forms>

## **QC41 EMPLOYEE LEASING REQUIREMENTS**

**Guidance:** All Sub-clauses apply when QC41 is required.

- A. The Seller **shall** establish and implement a service plan that includes:
  1. Provisions for ensuring personnel performing the service have the education, experience, knowledge and/or combination to successfully deliver the service ordered by the Buyer.
  2. Key measures of service performance, including action thresholds, to be used to gauge the consistency, efficiency and effectiveness of the service being provided.
  3. Specific actions to take when performance measurements indicate that the service is not meeting expectations.
  4. A means to obtain and incorporate customer feedback on service performance.
  5. A method to continually improve the level of service.
- B. The Seller **shall** institutionalize the service plan as part of their standard management system.

## **QC42 RESERVED**

## **QC43 EEE COUNTERFEIT PREVENTION**

**Guidance:** Sub-clauses A through J always apply. Sub-clauses K and L only apply if they are specifically invoked individually.

- A. The Seller **shall** maintain compliance to AS5553, Counterfeit Electrical, Electronic, and Electromechanical (EEE) Parts – Avoidance, Detection, Mitigation, and Disposition, for the prevention of counterfeit or suspect counterfeit part use and their inclusion in product(s) delivered to the Buyer.
- B. Reserved
- C. Counterfeit part prevention processes **shall** include:
1. Training of appropriate persons in the awareness and prevention of counterfeit parts.
  2. Application of a parts obsolescence monitoring program.
  3. Controls for procuring product from original or authorized manufacturers, authorized distributors, or other approved sources.
  4. Requirements for assuring traceability of parts and components to their original or authorized manufacturers.
  5. Verification and test methodologies to detect counterfeit parts.
  6. Monitoring of counterfeit parts reporting from external sources.
  7. Quarantine and reporting of suspect or detected counterfeit parts.
  8. Plans for the archival and retrieval of records pertaining to the above counterfeit prevention processes.
- D. The counterfeit protection plan **shall** be subject to Buyer approval and may be disapproved at any time if it is discovered that the plan does not provide for an appropriate level of assurance for procuring material in compliance with the PO to Buyer's satisfaction. Buyer reserves the right to audit the Seller's counterfeit prevention process, and associated records, at the Seller's facility and the facilities of its sub-tier suppliers.
- E. The Seller **shall** ensure all electrical, electronic, electro-mechanical and electro-optical component parts delivered and/or used in the manufacture of deliverable products are from one of the following sources, listed in order of preference:
1. Original Equipment Manufacturer (OEM) / Original Component Manufacturer (OCM)
  2. Authorized Franchised distributor.
  3. NGC-approved Electrical/Electronic Distributors.
- F. The Seller **shall** impose appropriate contractual requirements on all tiers of its supply chain to ensure the substance of QC43, AS5553, DFARS 252.246-7007, as applicable, are met at all levels of the sub-tier supply chain.
- G. The Seller **shall** immediately report instances of:
1. Acquiring suspect counterfeit parts to GIDEP.
  2. Providing suspect counterfeit parts to Buyer.
- H. Seller **shall** subscribe to GIDEP alerts and review and take appropriate corrective and preventive actions on all GIDEP alerts applicable to material offered for re-sale. This includes alerts for suspect/counterfeit conditions as well as routine technical issues.
- I. The Seller **shall** provide material traceability documentation with each item being delivered. Minimum traceability requirements for electronic items **shall** include:



- J. The name of all supply chain intermediaries between the Manufacturer/Authorized Distributor and the Seller (if the Seller is not the Manufacturer or Authorized Distributor).
- K. Manufacturer name.
- L. Manufacturer and/or Buyer's part number and dash number as applicable.
  - 1. Any applicable batch identification for the item(s) such as date codes, lot codes, heat lot, serializations, or other identifications. If the item in question is not batch-controlled or serialized in any way, the supplier **shall** indicate this with a statement such as "No batch control or serialization applies," or similar wording.
  - 2. Signature or stamp with title of seller's authorized personnel signing the certificate.
  - 3. Distributors **shall**, in addition to the above, include their company's certification for each part number shipped.
- M. For cases where there is no availability of components that can meet the above requirements, the Seller may request authorization to procure components from unauthorized sources and then validate their authenticity using third-party testing. Such requests **shall** be made by submitting to the Buyer a proposed authenticity validation plan, using the RC/I Process. The Seller **shall** withhold the procurement of any components from unauthorized pending the review and approval of the RC/I with its accompanying authenticity validation plan.
 

**NOTE:** Fill out the **RC/I Form P0-F030** found at the Oasis website:  
<https://www.northropgrumman.com/suppliers/contracts/forms>
- N. For assemblies containing multiple components, the Seller **shall** provide a certification stating that all components of the assembly are traceable to the OEM/OCM or Franchised Distributor.
- O. EEE Lot/Date Code and Age Management
  - 1. Supplier **shall** provide no more than one date code for each line item shipped. If multiple line items of the same device are shipped, supplier **shall** segregate and identify each sub lot. Supplier **shall** ship the full line item quantity for each device unless the purchase order directs otherwise.
  - 2. EEE parts **shall** be less than four (4) years old upon receipt at the Northrop Grumman facility. Age **shall** be indicated by a manufacturer date code on individual parts and/or intermediate containers.

## QC44 RESERVED

## QC45 PRODUCT PRESERVATION

**Guidance:** A, B, and C always apply when QC45 is required. D is only required if it is explicitly invoked.

- A. Packaging and Preservation
  - 1. Seller **shall** incorporate good commercial practices for preservation and packaging of all articles that apply to this Procurement Document.
  - 2. Seller **shall** identify each package permanently and legibly with Procurement Document number, manufacturer's name, date shipped, and packing sheet number.
  - 3. Packaging **shall** be selected, to the extent necessary, to provide protection from physical and environmental damage during shipping and handling, including cushioning materials as required, to protect and to restrict movement of items.

4. All materials that are volatile, toxic, chemical by nature, or emit fumes, which are harmful to human health, **shall** be properly contained in accordance with applicable health and safety requirements. Seller **shall** take appropriate measures to prevent handling damage from preparation for shipment through receipt (i.e., palletizing, shrink wrapping, or otherwise securing materials for shipment to prevent product degradation during transit).
  - a. Containers **shall** be plainly marked in accordance with Department of Transportation (DOT) 49 Code of Federal Regulations (CFR) parts 171-180, Subchapter C—Hazardous Materials Regulations.
  - b. Safety Data Sheet **shall** be included with each shipment.

## B. Storage and Shelf Life

1. Seller **shall** identify materials and articles having definite characteristics of quality degradation or drift with age and/or the environment.
  - a. Identification **shall** indicate the date and/or cycle that the critical life was initiated and the date and/or cycle at which the useful life will be expended.
  - b. If environment is a factor in determining useful life, identification **shall** also include the storage temperature, humidity, etc., required to achieve the stated useful life.
  - c. In no case **shall** materials or articles be supplied to the Buyer with less than 75% of its useful life or cycles remaining.
- C. Seller **shall** provide a copy of the manufacturers Certificate of Conformance (CoC) that defines the shelf-life characteristics of any material that fits into this category. Identification **shall** include the following information as a minimum:

1. Date of manufacturer
2. Batch and/or lot numbers
3. Date of expiration
4. Procurement Document number
5. Any special storage conditions for the material.
6. If a material has no identified shelf life, the certificate **shall** note this condition. Seller's certificate should be traceable to the place of procurement or manufacturer.

## D. Wire, Wire Harness, and Cable Storage Requirement

If a product contains silver-plated wire or fluoropolymer-insulated wire (such as ETFE/XL-ETFE/FEP/PTFE/or similar), then product packaging **shall** include the following:

1. **Bagging.** Product **shall** be placed in water-vapor-proof packaging in accordance with MIL-STD-2073-1, Standard Practice for Military Packaging, see Method 51 or Moisture Barrier Bagging (MBB) in accordance with MIL-PRF-81705, Barrier Materials, Flexible, Electrostatic Discharge Protective, Heat-Sealable, see Type I.
2. **Capping.** Ends **shall** be capped with heat shrinkable end-caps in accordance with AS23053/4, General Specification for Insulation Sleeving, Electrical, Heat Shrinkable, or dipped in Glyptal (GLPT) insulating varnish (10-9002-A / 10-9008 / NSN 5970-00-901-5331) for a length of approximately 2.5-centimeter (1-inch).
3. **Desiccant (Activated).** Activated desiccant **shall** conform to MIL-D-3464, Desiccants, Activated, Bagged, Packaging Use and Static Dehumidification, see Type II. Minimum quantity of desiccants used

(unit packs) shall be based on the protective package's interior surface area, in accordance with MIL-STD-2073-1 Method 50, Formula 1.

4. **Irreversible (Maximum) Humidity Indicator Card (i-HIC).** i-HIC shall be in accordance with MIL-I-8835A, Indicator, Humidity, Card, Chemically Impregnated, or equivalent (language from IPC J-STD-001ES) with Indications in the range including the following: (50-60-70-80-90%). The Seller shall record the max exposure registered just prior to shipment and shall retain this information as a quality record.

#### QC46 SELLER-PROVIDED ACCREDITED CALIBRATION CERTIFICATE

- A. Measurement and Test Equipment provided by the Seller shall be accompanied by a certification attesting that the Measurement and Test Equipment (M&TE) was calibrated:
  1. In accordance with ISO/IEC 17025 or ANSI Z540.3 by a laboratory accredited to one of those standards OR
  2. By the OEM in accordance with their own internal calibration process and standards

#### QC47 ELECTRICAL CONNECTOR CONTACTS

- A. All electrical connector contacts (pins) used in any connectors, connector-containing cables, or connector-containing assemblies shall have one of the below finishes:
  1. Gold-plated in accordance with ASTM B488, Standard Specification for Electrodeposited Coatings of Gold for Engineering Uses, see Type II, Code C, with a 50-microinch minimum thickness over the entire contact body. In addition, the contact area shall have a nickel underplate per AMS-QQ-N-290, class 2, with a 50-microinch minimum thickness preceding the finish plating.
  2. Silver-Plated in accordance with ASTM B700, Standard Specification for Electrodeposited Coatings of Silver for Engineering Uses, with a minimum thickness of 40 microinches over the entire contact body. In addition, the contact area shall have a nickel underplate per AMS-QQ-N-290, class 2, with a 50-microinch minimum thickness preceding the finish plating.

#### QC48 OEM OR AUTHORIZED DISTRIBUTOR

- A. The Seller shall procure circuit components and other materials intended to conduct electrical current exclusively from the Original Equipment Manufacturer (OEM) or their authorized distributor(s).

#### QC49 COMMERCIAL SOFTWARE AUTHENTICITY

- A. Seller shall provide evidence that software sold is authentic and as released by the developer. This evidence may be in one of several forms, including:
  1. Certificate of authenticity including the following information:
    - a. Identifying nomenclature/traceability such as: Item Name, Product Number, Version Number, Serial Numbers if applicable, etc.
    - b. Number/type of license(s) (as applicable)
    - c. Statement of authenticity
  2. Unique software license number generated by the developer

3. Evidence of Seller's status as an authorized distributor
4. Evidence of the chain of custody for the software between the developer and the Seller

## QC50 PURCHASE ORDER REVIEW

- A. Seller **shall** host a Purchase Order review with the Buyer within 30 days of the issuance of the Purchase Order. The Purchase Order review **shall** consist of:

1. Review of Terms & Conditions
2. Review of project timeline & confirmation of delivery dates
3. Discussion of any identified technical requirements
4. Review of the completed Q-clause Compliance Matrix form (Q026F02)

- a. Seller **shall** complete the Q026F02 form prior to the Purchase Order review meeting

NOTE: the form can be accessed here: <https://www.northropgrumman.com/Suppliers/Contracts/Quality-Documents>)

## QC99 NO Q-CLAUSE REQUIRED

**Guidance:** QC99 **shall** be applied when SMA determines no Q-Clauses are needed in accordance with Section 3, Standard Quality Requirements, of this document.

- A. Q-clauses not required.

## QC100 SUPPLIER STATEMENT OF WORK

**Guidance:** QC100 is applied when quality requirements are specified within a Supplier Statement of Work (SOW).

- A. Seller **shall** comply with the quality requirements noted within the applicable Statement of Work (SOW).

## 5 ACRONYMS

The following acronyms are used in this document:

Term	Definition
ANSI	American National Standards Institute
ASPL	Approved Special Process List
ASTM	American Society for Testing and Materials
CFR	Code of Federal Regulations
CMMI	Capability Maturity Model Integration
CoC	Certificate of Conformance
COTS	Commercial Off the Shelf
DCMA	Defense Contract Management Agency
DFARS	Defense Federal Acquisition Regulation Supplement
DoD	Department of Defense
DODISS	Department of Defense Index of Specification and Standards
DOT	Department of Transportation
ECP	Engineering Change Proposal
EEE	Electronic, Electro-Mechanical, and Electrical
EIDP	End Item Data Package
ESD	Electrostatic Discharge
FAI	First Article Inspection
FOD	Foreign Object Debris
GIDEP	Government Industry Data Exchange Program
GLPT	Glyptal
GSC	Global Supply Chain
i-HIC	Humidity Indicator Card
IDEA	Independent Distributors of Electronics Association
IEC	International Electrotechnical Commission
ISO	International Organization for Standardization
IT	Information Technology
ITIL	Information Technology Infrastructure Library
M&P	Materials and Processes
M&TE	Measurement and Test Equipment
MBB	Moisture Barrier Bagging
MGI	Mandatory Government Inspection
MIL	Military
MRB	Material Review Board
NCSL	National Calibration Standards Laboratory International
NDT	Non-Destructive Testing
NG	Northrop Grumman
NGC	Northrop Grumman Corporation

Term	Definition
OASIS	Online Automated Supplier Information System
OCM	Original Component Manufacturer
OEM	Original Equipment Manufacturer
OOT	Out of Tolerance
PO	Purchase Order
QC	Quality Clause
QMS	Quality Management System
RC/I	Request for Change/ Information
SCAR	Supplier Corrective Action Request
SDS	Strategic Deterrent Systems
SMA	Supplier Mission Assurance
SMRR	Supplier Material Review Report
SOW	Statement of Work
SQAR	Supplier Quality Assurance Requirements
ST	Special Tooling
STD	Standard
STE	Special Test Equipment
UID	Unique Identification
U.S.	United States
U.S.C.	United States Code