1.0 PURPOSE

This document has been established to provide the quality flow-down requirements to applicable Suppliers listed on the Approved Supplier List (ASL). This document outlines requirements for suppliers of materials, products or services provided to Northrop Grumman Mesa Facility (NG). It is intended to clearly communicate to the Supplier the requirements they are responsible for meeting in relation to quality.

A summary of each code will be included at the start of each code in italics, with the full technical details following in standard text.

It is understood by both NG and the Supplier that this document is applicable to every purchase order/contract where the procured product, services or processes are deliverable/ consumable by NG customers. Suppliers of specific component parts or special processes must meet the quality system requirements contained herein when performing to a NG purchase order/contract which contains reference to this document.

NOTE: The quality codes listed in this procedure are the only authorized and recognized codes to be used by SQE/PQE’s when coding Purchase Orders and Requisitions.

2.0 RESPONSIBILITY AND AUTHORITY

Mission Assurance/Quality SQE/PQE — Responsible for ensuring proper quality codes are flowed down on the purchase order to the suppliers.

3.0 DEFINITIONS

None

4.0 FLOWCHART

None

5.0 PROCEDURE

5.1. Quality Code List

18QC01 Quality System Compliance and Flowdown
18QC02 Non-Conforming Material and Supplier Performance
18QC03 Certificate of Conformance
18QC04 Records Retention
18QC05 Packaging, Labeling and Traceability
18QC06 First Article Inspection (FAI) and New Product Introduction (NPI *note 2)
18QC07 Material and Process Certification
18QC08 National Aerospace and Defense Contractors Accreditation Program (NADCAP)
18QC09 Control Plan
18QC10 Certified Test Report
18QC11 Northrop Grumman Property
18QC12 Welding Certifications
18QC13 Inspection Records
SUPPLIER MATERIAL QUALITY REQUIREMENT CODES

18QC13M Evaluation Report
18QC14 Consent to Ship Approval
18QC15 Fixed Process and Approval of Changes
18QC16 Northrop Grumman Source Surveillance
18QC17 Northrop Grumman Source Inspection
18QC18 Government Source Surveillance
18QC19 Government Source Inspection
18QC20 Process Control and Verification
18QC21 Age Limitations, Life Limits and Shelf Life
18QC22 Large Material Packing Instructions
18QC23 Acceptance Inspection Equipment
18QC25 Requirements for Calibration Services
18QC26 Government Property
18QC27 Special Tooling Requirements
18QC28 Non-Destructive Test (NDT) Certification
18QC30 Build Readiness Review
18QC35 Electronics COTS
18QC36 ESD Packaging
18QC37 Packaging for International Shipment
18QC39 Soldering

5.2. Supplier Quality Assurance Requirements Text

18QC01 Quality System Compliance and Flowdown

Supplier for materials with this code are required to have ISO or AS certification. This requirement also flows to all sub-tier suppliers for the ordered material. NG reserves the right to confirm the supplier’s certification status and compliance through documentary evidence or site audits.

All suppliers shall maintain quality system certification to a current revision of ANSI/ASQ/ISO 9001, or the current revision of SAE AS9100.

Registration with, or certification by, an independent third party certification body or registrar is required. Evidence of registration or certification shall be submitted upon completion of initial registration or recertification.

All suppliers shall maintain quality system registration / certification by, an independent third party certification body or registrar is required. Evidence of registration or certification shall be submitted upon completion of initial registration or recertification. As noted by Supplier type below;

Manufacturing Suppliers – ANSI/ASQ/ISO 9001, or SAE AS9100

Special Processing Suppliers – NADCAP certification

Calibration Suppliers – ISO 17025

Distributors – ISO 9120, or ANSI/ASQ/ISO 9001, or SAE AS9100
NG reserves the right to conduct surveillance at the supplier's facility to determine that the supplier's quality system meets the requirements of the quality standard.

NG recognition of the supplier's system does not constitute acceptance of goods or services or relief of purchase order or subcontract requirements.

Supplier shall have systems and methods to assure full compliance to all Quality Purchase Order (PO) codes and requirements applicable to this PO. When products or services applicable to this PO are procured by the supplier from sub-tier suppliers, the supplier shall have a system in place to flow the Quality PO code requirements and all other requirements, as necessary, to assure full compliance is achieved.

18QC02 Non-Conforming Material and Supplier Performance

All material identified for delivery to NG that varies from documented print or processes must be submitted to NG for Material Review Board review before shipment. Non-conforming material identified at an NG site may be subject to a processing fee and any costs associated with the non-conformance. Supplier performance is monitored on an ongoing basis and suppliers with a history of poor performance may be required to cover the costs of third party inspections.

Suppliers do not have MRB authority on behalf of NG.

Supplier shall not deliver any material that departs from drawing, specification, maintenance or approved process requirements. Non-conforming material is to be submitted for review and disposition on the NG Supplier Request for Material Review Board (SRMRB) form before the material is shipped. The SRMRB request form (QA-F007) is to be completed and routed to the applicable Supply Chain Buyer for review and disposition. The submittal of an SRMRB to NG for review may result in a $500 debit to supplier for analysis and disposition.

Root Cause and Corrective Action documentation, along with all objective evidence, must be submitted with any SRMRB. Failure to submit will result in rejection of SRMRB request. If dispositioned acceptable, the non-conforming part(s) must be clearly identified and segregated from conforming product. The supplier shall amend the lot number to include the NC number, e.g. 123456-NCxxxxx. A copy of the dispositioned and approved NG Nonconformance report shall accompany every delivery of the affected part(s). Product that does not meet NG requirements may be provided to NG only after this approval has been given.

Non-conformances discovered at NG (receiving inspection, in process build, final inspection, testing, or not previously approved on an SRMRB request), that are supplier caused, are subject to a processing fee per rejection. Suppliers are responsible for all parts, processes, and services rendered by sub-tier suppliers.

Any quality concerns or rejections as a result of the sub-tier supplier are the responsibility of the supplier. NG may chargeback a supplier for rework, repair, analysis and/or travel related to nonconforming product where it has been determined that the non-conformance is supplier caused and the suppliers schedule to complete the rework/repair does not support NG’s scheduled need for the product.

Supplier shall notify NG Buyer of any systemic quality concerns that may affect the quality or performance of product already delivered to NG. The supplier shall provide prompt, written notification to NG Buyer if nonconforming product or process escapes are identified after shipment to NG.
Supplier performance is reviewed by NG SCM on a regular basis. Suppliers with a low performance may be subject to third party inspection being imposed. Third party is defined as an independent contracted inspection service acting on the behalf of NG, performing final inspection(s) at the supplier location to ensure NG requirements are met. The cost of this third party over inspection would be at the supplier’s expense.

18QC03 Certificate of Conformance

A supplier Certificate of Conformance (C of C) is required for the identified part and must include the fields called out below unless otherwise approved by NG. The C of C shall also include a statement that the part conforms to requirements along with a listing of any approved exceptions.

Supplier shall provide a C of C with each shipment certifying that the part in the shipment meets all Specification/Drawing, Manufacturing Process, Inspection and Testing, or any other requirements as applicable. Failure to submit the certification will result in rejection of the lot. Mark the appropriate container “DATA ENCLOSED,” when applicable.

The Certificate shall contain as a minimum:

- Supplier’s name and location.
- Manufacturer’s name and location, if different.
- Date of Manufacture / expiration, if applicable.
- Date of Certification, signed or stamped and “Title” of certifying official of the supplier.
- NG Part Number and Revision level.
- Manufacturer's Part Numbers and National Stock Number, if applicable.
- NG Purchase Order/Contract Number and line item number(s).
- Quantity of items.
- Country of Origin
- Identification of the lot number, batch and/or date codes, all serial numbers, if applicable.
- Shelf Life Requirements, if applicable.
- Fixed Process Identifier, if applicable.
- Reference any Non-Conformance/deviation number.
- Applicable governing specifications and revisions as specified on the NG Purchase Order/Contract and notes.
- A statement certifying material meets all requirements of the contract such as: “The undersigned, as the authorized representative of the contractor, warrants and represents all the information supplied above is true and accurate and that the material covered by this certificate conforms to all contract requirements, including but not limited to the drawings and specifications.”

Copies of an original manufacturers C of C will be included in distributors submissions unless written approval is received from NG.

Deviation from these minimum requirements is allowed with written approval from NG.

Note 1: C of C shall be supported by inspection and test data, material analysis, or certification from the raw material producer or processor and shall be made available as requested for specifications such as raw material, processed material, processes, etc.
Note 2: When the items on this purchase order are supplied by a distributor, a copy of the manufacturer’s certification and the distributor’s certification stating compliance and the manufacturer’s name and address shall be provided. (e.g., raw material, pan stock, COTS (commercial off the shelf))

Note 3: Any approved deviations or non-conformances must be listed on the C of C. Assembly C of C’s must call out any component deviations or non-conformances used in the production of the assembly.

Note 4: Country of Origin; Non-electronic COTS parts shall not be sourced from or manufactured in China.

18QC04 Records Retention

Records must be maintained for 15 years unless otherwise directed or agreed upon with NG. Distributors shall ensure their manufacturers maintain applicable records. For COTS their specific industry standards may apply.

Records generated as the results of performance to a NG issued purchase order/contract shall be maintained and preserved as legible for a period of fifteen (15) years, unless otherwise directed by contract. It shall be available for review by authorized Mission Assurance/Quality representatives, NG customers, and/or Government representatives.

Additionally, distributors shall assure that manufacturers maintain quality assurance/inspection records and that these records are also available upon request. These records shall include, but are not limited to, receiving, in-process, and final inspection records, C of C, raw material mill certifications, test results, special process documentation, documented non-conformances and corrective actions, and measuring and test equipment calibration documentation etc.

Commercial Off the Shelf (COTS) may be subject to specific industrial standards; exemptions or modifications of record retention may apply.

18QC05 Packaging, Labeling, and Traceability

Suppliers are responsible for utilizing packaging that prevents shipping or handling damage and maintains traceability unless otherwise directed by print or P.O. Suppliers are required to maintain traceability through the full flow of their processes from procurement to shipment.

Packaging — Supplier is responsible for proper packaging to prevent damage, corrosion, or contamination to the parts whether through part-to-part contact or normal handling via the selected carrier environment. Packaging peanuts are not permissible. Packaging is part of the manufacturing process and shall be included in the supplier’s process documentation. Product produced that require tamper proof seals are to be placed across any areas of internal access. Part packaging shall be clearly identified and segregated by part number.

Product requiring preservative oil shall be packaged in a MIL approved bag, eg, MIL-DTL-117, Type II, Class C, Style 1, 2; or MIL-DTL-117, Type III, Class C, Style 1. When heat sealing the closure of the bag, allow for enough space for the bag to be sealed two additional times.

Product shall not be co-mingled with other part numbers. Each part number requires its own cardboard box; however, a master cardboard box containing smaller cardboard boxes is permissible. Each manufacturing lot shall
Supplier material quality requirement codes

be identified and segregated to ensure proper traceability. Each individual box shall be identified with the part number, revision, lot, quantity, P.O. number, and serial number (if applicable). The master label shall include the part number, revision, lot, quantity, and P.O. number.

**Labeling and Traceability — This does not replace any part identification as required by the engineering drawing and/or Purchase Order notes.**

Supplier shall maintain a system to identify the manufacturer of the item(s) on this purchase order/contract to support material traceability. Supplier shall supply identifying lot number which shall be traceable back to manufacturing. The supplier shall maintain traceability data for parts, materials, and assemblies from procurement through fabrication, assembly, test, and delivery.

**18QC06 First Article Inspection (FAI) and New Product Introduction (NPI [note 2])**

A FAI or NPI is required for the material covered in this order. An updated FAI may be required if the conditions called out in the notes of this code occur during the life of the P.O.

First Article Inspection

Supplier shall perform and complete a First Article Inspection (FAI) in compliance with AS9102 requirements and submit the FAI to NG File Transfer web portal for approval prior to shipment of any items on this purchase order/contract.

The FAI shall be performed for an item representative of the lot/process of the items on purchase order/contract. This includes all process details and sub-assembly details which constitute the end-item ordered. The FAI shall not be considered complete until all non-conformities have been resolved and the FAI is reviewed and approved by Mission Assurance/Quality.

Allow 5 working days to complete the review of the FAI. Approval will constitute AS9102 Form 1 signed off by a Mission Assurance/Quality Representative. No shipping prior to approval. FAIR package and any sensitive documents, included but not limited to blueprints or other controlled technical data, shall be transmitted via a secure method with encryption. Encryption passwords and encrypted documents shall never be sent in the same communication.

**New Product Introduction**

Supplier shall employ a New Product Introduction discipline with regards to this line item of the Purchase Order. New Product Introduction is for all first-time product production runs or product with a greater than two year gap in production, unless otherwise specified.

A checklist detailing the part manufacturing process plan shall be used to ensure acceptance and quality compliance. A review of the product process flow documentation and checklist for inspection and validation may be requested prior to production release and/or shipment. The package containing the initial shipment shall be identified along with the part used for First Article inspection.

**Additional Submission requirements:**

- Measures on the boundary condition of the print must go to the first non-boundary significant digit (i.e. 0.20 reported to 0.201 or 0.199)
- “All” notes and dimensions need to be bubble charted.
• If a specification is in metric the measurement should be made in metric.
• A ballooned drawing corresponding with Form 3 is required to be submitted with the FAIR; a supplier’s modified drawing shall not be used.
• Basic dimensions shall be included on Form 3

**Note 1:** The FAI shall be updated (Delta FAI) when changes occur to any of the following: part number configuration, method of production, to include new process equipment, tooling, measuring equipment, and/or process flows, and/or facility re-location, change in location of machinery or applicable equipment (i.e. – unplug equipment and relocate to new area within the facility), a natural disaster, such as fire, flood or earthquake which may adversely affect the manufacturing process, or when required as part of the corrective action process. Change of sub-tier suppliers requires a delta FAI submittal.

**Note 2:** A FAI is not required if one has already been submitted and approved for the product revision on a previous procurement and there have not been any changes listed in Note 1, unless otherwise specified. If this applies, the supplier should note the applicable FAI/NPI which applies on the shipment documentation.

**Note 3:** A FAI is not required for COTS parts ordered to an NG part number drawing as long as the following conditions are met:

1) Parts are certified by source of supply identified on drawing with a certificate of conformance showing the same source of supply and supplier part number listed on the drawing with no exceptions or deviations.

2) No modifications or deviations to COTS part are required by the drawing or purchase order.

### 18QC07 Material and Process Certification

*Supplier must include certification documentation that special processes, or materials were made as called out by the approved manufacturing process and any applicable standards (MIL-STD, ATSM, ANSI, etc...)*

Certifications requiring material test data are covered by 18QC10 – Certified Test Reports.

Supplier shall submit certification(s) for the material(s), and/or process(es), either physically or electronically, in conjunction with any 18QC08 NADCAP requirements used in this order and include those in the shipping documentation package, when applicable.

Certification(s) shall include, as a minimum:

- The purchase order number/contract.
- Date of processing.
- Quantity and/or weight processed, including accept/reject status.
- The material and/or process specification(s) number and revision that the material(s) and/or process(es) conform to, where applicable.
- The nomenclature(s) of the material(s) and/or process(es) as defined on the drawing.
- The certifications shall be linked together by a common reference traceable forward and backward, e.g. heat lot.
• Certification(s) must be signed by an officer/agency that has certified the material(s) and/or process(es) used whose authority is binding on the company.
• Any approved exceptions or deviations from the process(es) or material(s) as written in applicable standards, specifications, etc…, not already called out on the print and/or part specific specification.

Failure to submit the certification(s) will result in rejection of the shipment.

**Note 1.** Where CARC paint is specified, at a minimum the following shall be submitted with every processed lot: (1.) a detailed information sheet identifying the CARC application procedures utilized. (2.) C of C for the CARC process and certifications for all sub-processes including but not limited to; Shot Peen, Abrasive- Grit Blast, Chemical Coating, Plating, Anodize, Etch, etc. (3.) Material certifications for paint and primers, including specific color, are required.

**Note 2.** All high strength fasteners shall be certified by the manufacturer to conform to the specified standards. An externally-threaded steel fastener of at least Grade 5, as defined by SAE J429, or Property Class 8.8 (metric equivalent), as defined by SAE J999 or ISO 898, e.g., bolts, screws, studs. Nuts are internally-threaded and not subject to the requirement.

**18QC08 National Aerospace and Defense Contractors Accreditation Program (NADCAP)**

*NADCAP accreditation is required for all applicable processes on this order*

All suppliers and their sub-tier suppliers shall use a NADCAP accredited special process house or a special process house approved in writing by Mesa Quality for special processes. Suppliers shall provide evidence with shipment certifying the special process(es) were performed by facilities that are NADCAP approved for the process being performed (i.e. Non Destructive testing, Heat Treating/Furnace Brazing, Chemical Processing, Paint, Coatings, Welding). NADCAP supplier approval information can be found at: [https://www.eauditnet.com/eauditnet/ean/user/mainpage.htm](https://www.eauditnet.com/eauditnet/ean/user/mainpage.htm).

**18QC09 Control Plan**

*A process control plan is required for this order prior to the start of production.*

Supplier shall create and submit a Control Plan prior to production. The Process Control Detail Plan, form SC-F006, may be used for this requirement, otherwise the supplier's internal format may be submitted with written approval from NG provided it meets the requirements called out below.

The Control Plan shall describe the overall process by which the supplier will assure the item’s conformance to all requirements of the purchase order/subcontract. The Control Plan will include the processes to be used to meet all purchase order/subcontract flow-down requirements, and the processes for assuring the quality of products from sub-tier suppliers. Any supplier documents referenced in the Control Plan shall accompany the submittal.

The Control Plan shall list the part characteristics which shall be inspected including the location of these inspections in manufacturing sequence, the sampling plans and quality levels, sampling procedures, the measuring and test equipment used, work instructions including revisions, criteria for approval or rejection of the product and the manner in which lot formations for product submissions are determined.
The Control Plan shall be updated to describe any changes made to the approved documented processes after submission. Revised Control Plan shall also be pre-approved before use.

18QC10 Certified Test Report

A Certified Test Report that includes the actual testing results is required for this order.

Supplier shall submit a test data report for this item upon successful completion of the item’s acceptance testing for each lot of material, parts, assemblies, and sub-systems by lot number prior to acceptance. The test report shall contain as a minimum:

- Company name and date.
- NG purchase order/contract number.
- National stock number and drawing number, as applicable.
- Date of Certification, signed or stamped and “Title” of Certifying official of the supplier.
- Description of supplies, lot number or other identification and lot quantity.
- Listing the characteristics inspected, product serial number (if applicable), sample and lot size, actual measurement(s), and number accepted.
- Recorded results obtained during the item’s acceptance testing (e.g.; material, processes, performance, functional, etc.) showing quantitative measurement results and tolerance(s) for values measured including all special testing performed on the item, any noteworthy observations, anomalies, or unexpected events; such as reports or raw material producers’ chemical, mechanical and physical analyses for product/process conformance.
- Serial numbers, lot numbers, date codes, and all other identifications used to track the item tested.
- Test data annotated with appropriate test operator and quality inspector level, signatures and/or stamps applied.
- Copies of all major and minor non-conformance’s and test failure reports with root cause and corrective action are required.
- A statement certifying material meets all requirements of the contract such as: “The undersigned, as the authorized representative of the contractor, warrants and represents all the information supplied above is true and accurate and that the material covered by this certificate conforms to all contract requirements, including but not limited to the drawings and specifications.”

18QC11 Northrop Grumman Property

This order requires the use of NG property. The supplier is responsible for the applicable property and shall not use it for other purposes without written NG permission.

Item(s) furnished to the supplier in conjunction with this order are the property of NG or NG customer. The supplier assumes total responsibility for care and maintenance of said property unless otherwise agreed to in this purchase order/contract. The supplier shall maintain accurate inventory and records for the property and provide this information to NG upon request.

The property is not to be used for products not identified on this procurement without the written consent of NG. Supplier shall not remove any markings or tags from the property. Supplier agrees not to sell, assign, loan, lease, mortgage, borrow against, pledge, or otherwise create a legal or equitable interest in the item(s) or otherwise permit the item(s) to be subject to any legal process.
18QC12  Welding Certifications

*The C of C must include a listing of the standards the supplier is certifying the product welds to. All weld repairs require prior approval from NG.*

Supplier shall ensure that all weldments meet the design and fabrication requirement of the applicable Technical Design Package (TDP). The supplier shall list all applicable standards used to weld and inspect the weldment on the C of C. Suppliers shall retain an outline the processes and controls utilized to achieve those standards (i.e.; Non Destructive Testing, Lot testing, certification requirements for welders and inspectors, etc.).

Subcontractor welding processes and procedures may be audited for compliance. The buyer shall be notified prior to any necessary weld repair, except where prior buyer approval has been granted or waived. NG considers welding a NADCAP required special process.

18QC13  Inspection Records

*Inspections records shall be maintained by the supplier and be available for NG upon request with the following exception; the supplier shall provide the current lot inspection records with every shipment for parts where dimensions apply prior to coating, e.g., phosphate, dryfilm lube, or CARC coatings.*

Part inspection records shall be maintained by the supplier. Reports shall include:

- The test and/or inspection procedure document number and revision level.
- Part number.
- Serial, lot, batch, or date code numbers, as applicable.
- Identification of each inspection point.
- Sample size used for each inspection.
- The results of each inspection point.
- Records annotated with quality inspector signatures and/or stamps applied.
- On-site records shall be available to NG within two business days of receipt of a written request unless otherwise noted by contract.
- Archived records shall be available to NG within five business days of a written request unless otherwise noted by contract.

Supplier shall ensure the requirements are flowed down to support the item(s) on this order to maintain full traceability. Suppliers and sub-tier suppliers shall maintain their respective inspection and test records.

18QC13M Evaluation Report

Supplier shall submit an evaluation report for any parts requiring evaluation, repair, refurbishment, or testing. The report shall contain the following:

- Statements of condition upon evaluation
- The work performed to repair, replace, or refurbish
- Testing post-work, if applicable
18QC14  Consent to Ship Approval

*Supplier must have a signed NG form QA-F012 before they have approval to ship.*

Supplier shall not ship any purchase order line item material until a Consent–To-Ship (CTS) approval is provided in writing from the NG Buyer. This CTS approval will be a signed CTS form (QA-F012) completed by NG. To obtain CTS approval, the supplier is to contact the NG Buyer and schedule a CTS review. The CTS review will require the supplier to provide all required Quality data three days in advance of the review. The CTS review may occur at the supplier’s site, at NG or by teleconference. A copy of the signed CTS form is to be included with the shipment.

18QC15  Fixed Process and Approval of Changes

*Supplier must have approval from NG before they make significant process changes in their production and inspection processes.*

NG defines a fixed process as a process that has been reviewed and approved by NG and supplier representatives and is to be controlled from unapproved changes. The fixed process does not imply permanence, as submittals for changes are permissible. NG reserves the discretion to control any or all aspects of the fixed process.

Fixed processes to be controlled shall be individually identified by NG Engineering. Said processes shall be specified in the Purchase Order.

Supplier’s configuration management system shall control the elements of the supplier’s and sub-tier suppliers’ design, manufacturing and process procedures, test procedures, and of the items on this purchase order/contract. Suppliers are responsible to document and control any portion of this purchase order, which is to be performed by the supplier and extend applicable portions of the purchase order flowed down to any sub-tier suppliers performing fixed processes.

**Approvals** — For parts identified by NG as fixed process, the supplier and sub-tier supplier shall be required to have approval by NG prior to initiation of production. Approvals do not relieve the supplier from exercising those control measures necessary to ensure that work performed by sub-tier suppliers is in accordance with specification for drawing requirements.

For each NG identified part requiring fixed process, NG may require the supplier or sub-tier supplier complete appropriate control document(s) and submit them to NG for approval. The document(s) may be in the supplier’s or sub-tier supplier’s format and shall be the document used for actual performance and inspection.

The documentation describing the process should at a minimum include but is not limited to the following:

- Part number or process name to include revision.
- Process work instructions, technique sheets, inspection plans, process drawings, flowcharts, etc.
- Personnel performing special processes shall be certified in accordance with applicable special process certifications on file available for review.
- Packaging methods and materials.
- Signature and title of person on authorizing document(s).
Note: Final approval shall have all required signatures on the stamp (see below) on the document for the fixed process submittal.

Changes - Supplier shall notify NG of any proposed or inadvertent changes to the approved process. The supplier shall not proceed with the initiation of production without written approval from NG. The supplier shall ensure that these requirements are flowed down to sub-tier suppliers that support the item(s) on this order to the lowest subassembly level. See 18QC06, Note 1, for documentation of the change expectations.

Change documentation should at a minimum include but is not limited to the following:

- A complete description of the change, including a statement of the “From” and “To” conditions of change.
- Justification for the change, including background information in sufficient detail to allow an adequate study of the proposed change.
- The proposed affectivity of the change stated either in terms of a calendar date or a part serial number range.
- A copy of the revised document, if required by NG; proprietary information, if applicable, may be excluded.
- Recompletion of the approval process.

Once the process has been approved, any change to the process requires NG written approval prior to implementation. Typographical errors, formatting errors, misspellings or clarifications changes are not considered a process modification or change.

18QC16 Northrop Grumman Source Surveillance

NG may perform a surveillance inspection with this order.

NG maintains the prerogative of source surveillance inspection by a NG Representative. NG shall notify the supplier if and when this option will be exercised.

18QC17 Northrop Grumman Source Inspection

NG shall perform a source inspection of this order before shipment is approved. If material is not ready for the visit time, NG may initiate a chargeback of the incurred costs.
Source Inspection by a NG Representative is required at the supplier’s facility. Supplier shall provide all test reports, inspection records (including access to all quality records and related data for contracted goods), facilities, assistance, equipment and personnel necessary to perform the appropriate inspection of product. Unless otherwise notified, the NG Representative will perform or witness end item acceptance tests.

Supplier shall notify NG Buyer, unless otherwise notified, at least:

- **Seven (7) working days** prior to performing product acceptance testing and/or
- **Fifteen (15) working days** prior to the expected time of the presentation of the item to NG Representative for source inspection. Shipment shall be withheld pending necessary action by the NG Representative.

Upon notification from the Supplier to the NG buyer of source inspection readiness, a NG Representative will make travel arrangements. In the event that the supplier notifies NG of source readiness and then does not have product ready on agreed upon date, NG may initiate a debit memo for expenses incurred (i.e. change of flight fees, cancellation fees, et al.).

Acceptance of source shall be denoted by a stamp and/or signature or both by the authorized NG Representative on the supplier’s inspection document to be included in the shipping documents package.

**Note:** If a NG non-USG Customer source inspection is required, the NG Customer Representative may accompany the NG Representatives when the source inspection is scheduled. During the scheduling of the source inspection NG Representative will notify supplier that the NG Customer may be accompanying him/her during the scheduled source inspection.

U.S. Government Source Inspection requirements will be covered by code 18QC19 – Government Source Inspection.

### 18QC18 Government Source Surveillance

*USG may perform site surveillance in conjunction with this order.*

During performance of this Subcontract/Purchase Order, activities of the supplier may be monitored by an authorized Government Representative through delegation from the Government Quality Assurance Representative (QAR) associated with the contractor’s facility. This may include audits, inspections, and/or tests. Government Inspection or release of product prior to shipment is not required unless otherwise notified, in writing, by the authorized government representative.

**Note:** Neither notification of NG by the authorized government representative nor notification of the supplier by NG is required.

### 18QC19 Government Source Inspection

*USG shall perform a source inspection of this order before shipment is approved.*

Government inspection is required prior to shipment. Upon receipt of the order, promptly notify the Government Quality Assurance Representative (QAR) who is assigned to the supplier, so that appropriate planning for:

- Government Source Inspection (GSI) and/or
- In Plant Quality Evaluation (IQUE) can be accomplished.
In the event, the Government representative or office cannot be located, the supplier shall notify the nearest Army, Navy, Air Force or Defense Logistics Agency inspection office. If the representative or office cannot be located, the supplier shall notify NG Buyer immediately. The delegated government representative may review work instructions and identify mandatory inspection points that the government must accept prior to further processing of the item.

Supplier shall notify the NG Buyer, unless otherwise notified, at least:

- **Seven (7) working days** prior to performing product acceptance testing and/or
- **Fifteen (15) working days** prior to the expected time of the presentation of the item to NG Representative for source inspection. Shipment shall be withheld pending necessary action by the NG Representative.

A letter of delegation (LOD) authority signed by the DCMA (Defense Contract Management Agency) showing that the specific part number being shipped has been granted GSI delegation shall also be acceptable. Any letter of delegation authority must be linked to the part numbers that have been granted delegation. Evidence of Government Source Inspection (QAR acceptance stamp or office number and signature on the shipping document) shall accompany each shipment of product to NG unless written approval is granted through the NG Buyer.

**18QC20 Process Control and Verification**

*Supplier shall perform Advanced Quality Product Planning activities for the order.*

NG requires the use of Advanced Product Quality Planning (APQP) on this purchase order. Supplier shall participate, to the level specified by NG, in the process for identifying key product and process characteristics.

The process for identifying key characteristics may include:

- Requirements Flow Downs
- Quality Function Deployment (QFD)
- Design Failure Mode Effects Analysis (DFMEA)
- Process Failure Mode Effects Analysis (PFMEA)
- Predicate or comparable design analysis.
- Design of Experiments (DOE).

Supplier shall record data for all identified key product and process characteristics and submit the data with the deliverable product. The supplier shall use the data to optimize key processes.

Supplier shall develop process flowcharts showing the manufacturing and inspection steps, including process control points for key characteristics.

At any time, during the term of this purchase order/contract, NG may notify the supplier of specific requests for on-site product verification, and/or an audit function.

Process verification may include product selection of a random sample for independent inspection, re-inspection of samples, witnessing inspection, or test by a NG Representative. Process verification is to ensure product integrity is being maintained.
Audits may be performed on Materials, Product, Gaging or Test Equipment, Calibration, Special Processes, Procedures and Work Instructions covering the in-process activities at the supplier. The supplier shall provide reasonable facilities, equipment, and assistance, including access to all quality records and related data for contracted goods.

18QC21 **Age Limitations, Life Limits, and Shelf Life**

Supplier is required to ensure material with limited shelf life has a minimum of 80% of the shelf life left when received at NG.

Product supplied, or any product used in a part or assembly supplied under this purchase order/contract, is considered age sensitive by the product’s manufacturer. The shipping documents shall state the shelf life and any unique environmental storage conditions, if required. The supplier shall assure that a **minimum of 80% of the shelf life**, unless otherwise specified with a supplemental quality document, is remaining at time of shipment to NG. If the product requires unique environmental storage conditions, the exterior package shall be clearly marked indicating the type of storage required. The date of manufacture and expiration date must appear on a certificate supplied with the material. Mark the appropriate container with “Data Enclosed.”

18QC22 **Large Material Packing Instructions**

Supplier shall pack the large product in accordance with the guidance of this code.

This special provision will take precedence over any conflicting packaging instructions contained herein.

Package per applicable NG material handling instructions:

- OMH-0001 — Raw Material Special Packing Instructions.
  - All large billets, barrels, castings and forgings must be palletized and bound to the pallet with steel banding or equivalent method to constrain material. Parts shall not be mixed and shall conform to part dimensions with minimum overhang.
  - All small and medium size billets, barrels, castings and forgings must be contained using either wood or corrugated material depending upon material characteristics. Parts with critical surfaces must be individually packaged.
  - Each heat lot must be packaged separately.
  - Certifications for raw material shall be included with each heat lot.

18QC23 **Acceptance Inspection Equipment**

Supplier is required to submit Measurement System Evaluation / Acceptance Inspection Equipment documentation and receive approval prior to the start of production or First Article Acceptance Testing.

Measurement System Evaluation (MSE) requirements apply to this Purchase order. Acceptance Inspection Equipment (AIE), Inspection Procedures, and Calibration Records for AIE used to perform the inspections and tests of those characteristics specifically identified must be submitted to NG for approval prior to production. Product manufactured prior to approval of MSE/AIE by NG will not be accepted for shipment without written approval by NG. MSE/AIE documentation shall contain sufficient information to allow review and approval.
AIE identification shall include the following:

- Part number, revision, and name.
- Specification number and paragraph, if applicable.
- Classification of characteristics number.
- Characteristic description and dimension/parameter.
- Purchase order number and revision.

Submission of standard measuring equipment shall include:

- Manufacturer
- Model number
- Accuracy
- Calibration procedure, as applicable

Functional gaging and laboratory equipment shall include:

- Gage number
- Gage drawing (2 copies)
- Set-up, calibration and operating procedures, as required

Inspection Procedures shall include:

- Inspection procedures applicable for all Classification of Characteristics items
- Visual Inspection Standards

Automated Acceptance Inspection Equipment (AAIE) and Non-Destructive Testing:

- AAIE and NDT Calibration Master drawings
- Drawings or functional descriptions of AAIE / NDT
- Gage reliability prove outs (as required)
- NDT personal Qualifications / Certifications

If the listed characteristic is performed by a sub-tier supplier or independent inspection service, their MSE/AIE must also be submitted by the Supplier to NG for approval. If functional testing is required, NG will specify the requirement in writing.

**18QC25 Requirements for Calibration Services**

*Metrology certification is required for metrology equipment ordered under the line item with this code. This code is not associated with Quality System Calibration requirements.*

Items supplied on this purchase order/contract require a calibration service and shall be calibrated by an organization whose system is in compliance with Calibration System Requirements; ISO 10012-1, Metrological confirmation system for measuring equipment; ISO/IEC 17025 using standards traceable to the National Institute of Standards and Technology (NIST), or ANSI/NCSL Z540-1, Calibration Laboratories and Measuring and Test Equipment—General Requirements.
Supplier shall provide a calibration certificate for each unit or item delivered and has a data sheet attesting to the actual measurements for each NG identified characteristic of calibration. All instruments must be received with at least 50% of their certification period remaining.

**18QC26 Government Property**

*Some materials or equipment associated with this order are the property of USG and require traceability in both use and/or consumption.*

Item(s) furnished to the supplier in conjunction with this order are the property of the U.S. Government. The supplier assumes total responsibility for care and maintenance of said property, in accordance with FAR 52.245-1, unless otherwise agreed to in this purchase order/contract. The supplier shall maintain accurate inventory and use records for the property and provide this information to NG upon request.

The property is not to be used for products not identified on this procurement without the written consent of NG. Supplier shall not remove any markings or tags from the property. Supplier agrees not to sell, assign, loan, lease, mortgage, borrow against, pledge, or otherwise create a legal or equitable interest in the item(s) or otherwise permit the item(s) to be subject to any legal process. The supplier shall use form DD1149 when transporting government property back to NG.

**18QC27 Special Tooling Requirement**

*Controls for special tooling used in conjunction with this order.*

For all special tooling that will be retained by the supplier for the purpose of fabricating production parts for NG, the supplier shall notify NG Buyer 15 working days prior to tool completion to schedule NG Tool Quality Source Inspection.

This order includes special tooling that will remain the property of NG or the U.S. Government. The referenced special tooling shall be stored at the supplier’s location. The supplier shall take reasonable care of said tooling. The special tooling is not to be used for products not identified on this procurement without the written consent of NG.

Supplier shall not remove any markings from the property. Supplier agrees not to sell, assign, loan, lease, mortgage, borrow against, pledge, or otherwise create a legal or equitable interest in the special tooling or otherwise permit the tooling to be subject to any legal process.

Supplier shall attach a NG supplied property tag to the special tooling identified on this order. The supplier shall maintain inventory records for the identified item(s). Copies of such records shall be made available to NG upon request.

If the NG supplied special tooling included with this purchase order is used in the manufacture of any 387-xxxx or 230-xxxx part as either production or development/experimental, or is otherwise a Boeing contracted Special Tool, the supplier shall conform to the requirements defined by Boeing@ BDS Seller Special Tooling Requirements document # D950-11059-1.
18QC28  Non-Destructive Test (NDT) Certification

Supplier is required to submit Non-Destructive Test documentation for approval before starting production.

Prior to fabrication on any deliverable item, supplier shall provide and receive approval for the planned manufacturing, testing, and inspection procedures for NDT. These procedures shall include, as applicable, drawings of the special tooling that may be used for the dimensional acceptance and plans for performing tests on raw, semi-finished, and/or finished materials, including special process techniques to be approved by a NDT Level III. The procedures must document all operations to be performed. Supplier is responsible for meeting all drawing/specification and approved fabrication process requirements.

Supplier shall include with each shipment a certificate that lists the Non-destructive Tests (NDT) performed, the specification(s) used, NDT method used, and the results of the inspection. Supplier shall maintain records to include the procedures/techniques used signature or stamp of the employee performing the NDT, the NDT certification level of the employee, and the results.

Identification of any sub-contracted testing services performed shall be clearly noted with the name and location of the facility. When radiography is performed, the resulting radiographs will be supplied with the parts. Film must be identified with NG part number and serial number.

18QC30  Build Readiness Review

A meeting between the supplier and NG, to discuss production and inspection details, is required before production is initiated.

A Build Readiness Review (BRR) shall be used when new, complex, or unique processes or products are manufactured. NG needs to confirm materials and processes are accurate and conform to the Technical Design Package (TDP), process documentation, inspection requirements, test instrumentation/equipment, tooling, gages, and training, are completed prior to product build. Milestone tracking may be used to track progress and monitor schedule requirements.

18QC35  Electronics COTS

Requirements associated with Commercial Off The Shelf components.

Certification and Traceability — Supplier shall provide a C of C with each shipment. The certificate must be dated and signed or stamped by an authorized representative. Failure to submit the certification will result in rejection of the lot. Mark the appropriate container “Data Enclosed.”

The Certificate shall include:

Required:

- Supplier’s name and location
- Manufacturer’s part number
- Batch identification such as date code, lot code, serial numbers or other identification
- NG purchase order and line item number(s)
- Quantity of items
As Applicable:

- Shelf life requirements such as shelf-life limitations, and storage conditions as recommended by manufacturer or required by specification
- All required governing specifications and revisions as specified on the NG purchase order/contract and notes
- Any exclusions to the requirements of the applicable drawings, specifications, purchase document requirements, or design configuration requirements and the method by which such exclusions were authorized by NG (e.g., CAR, NC – deviation or waiver).

**Counterfeit Parts Prevention** — Supplier shall provide authentic parts with traceability certification to the Original Component Manufacturer (OCM). Counterfeit electronic parts and assemblies are defined in SAE AS5553: Counterfeit Electronic Parts, Avoidance, Detection, Mitigation, and Disposition. Supplier shall implement appropriate controls to assure product origin and conformance. This applies to any assemblies that contain electrical parts that could be procured from a sub-tier to the ultimate purchase order supplier.

**Shelf Life** — The items supplied under this order are subject to age limitations. The date of manufacture or the cure date and/or expiration date shall appear on each container and on a certificate supplied with the material. Unless otherwise notified the product shall remain useable for a minimum of 12 months after receipt at NG.

**Moisture/Reflow Sensitivity** — Surface mount devices shall be handled and packed in accordance with IPC/JEDEC J-STD-033, Handling, Packing, Shipping, and Use of Moisture/Reflow Sensitive Surface Mount Devices.

**Electrostatic Discharge** — If the part is considered to be sensitive to electrostatic discharge all containers and paperwork shall be marked accordingly, reference MIL-STD-129, Military Marking for Shipment and Storage, Figure 37. For ESD Class 1 and 2 components all leads must be shorted by material having a surface resistivity (rs) between 1E5 and 1E12 ohms per square. Packing should provide the necessary protection during shipping.

Additional information can be found in MIL-STD-1686, Electrostatic Discharge Control Program for Protection of Electrical and Electronic Parts, Assemblies and Equipment (Excluding Electrically Initiated Explosive Devices), and MIL-PRF-81705E, Barrier Materials, Flexible, Electrostatic Discharge Protective, Heat-Sealable. NG has determined that “Pink Poly” (polyethylene antistatic) bags or material is an unacceptable packaging medium and shall not be used.

**Shipping Authorization** — Written authorization from the buyer is required for any deviations from the purchase order requirements, including partial shipments or shipment of multiple date codes per line item.

**Solderability** — Solderability of electronic and mechanical components and wires must meet the criteria of J-STD-002, Solderability Tests for Component Leads, Terminations, Lugs, Terminals, and Wires, Category 3.

**Sub-Tier Flow Down** — Requirements of this code shall be flowed down to sub-tier suppliers.

**18QC36 ESD Packaging**

Packaging of this order shall be designed to prevent Electro Static Discharge damage to the product.
The part is considered to be sensitive to electrostatic discharge. All containers and paperwork must be marked accordingly. All leads must be shorted by material having resistivity less than one tera OHM/Square. Packing should provide the necessary protection during shipping.

**18QC37 Packaging for International Shipment**

*Packaging of this order shall meet international shipping packaging requirements.*

The items supplied under this order will be shipped internationally. Packaging shall comply with standard practices of the industry to ensure safe delivery of the material without marks, scratches, dents or other damages as well as provide a means to prevent corrosion from moisture and salt. All wood packing shall meet the requirements of ISPM-15 and be stamped with the approved IPPC stamp prior to shipping.

**18QC39 Soldering**

*Soldering performed in conjunction with this order must comply to applicable Soldering standards.*

Any or all of the following standards may apply:

- J-STD-001 Class 3 requirements for Soldering.
- IPC-A-610 Class 3 requirements for Solder.
- Solderability of printed wiring boards must meet the criteria of J-STD-003 Category 3.
- Solderability of electronic and mechanical components and wires must meet the criteria of J-STD-002.
- Category 2 (Typical Coating Durability.) Samples shall be preconditioned using Condition Category E (4 hour bake at 155 C)."
- Fluxes shall meet the requirements of J-STD-004, Types RO, RE, or OR and activity levels L0 or L1.
- Solder bar shall meet the requirements of J-STD-006.
- Solder wire shall meet the requirements of J-STD-004 and J-STD-006.
- Solder paste shall meet the requirements of J-STD-004, J-STD-005, and J-STD-006.

**6.0 RECORDS**

Records must be maintained per MA-0500, Control of Records and the Records Retention Schedule.

**7.0 REFERENCES**

- ANSI/ASQ/ISO 9001 Model for Quality Assurance in Design/Development, Production, Installation and Servicing
- SAE AS9100 Aerospace Standard Quality Management System Requirements for
- ISO/TS16949 Automotive Quality System Certification
- AS9102 Aerospace First Article Inspection Requirement
- ISO 10012-1 Calibration System Requirements
- ISO/IEC 17025 National Institute of Standards and Technology
- ANSI/NCSL Z540-1 Calibration Laboratories and Measuring and Test Equipment-General Requirements
- FAR 52.245-1 Government Property
- D950-11059-1 Boeing BDS Seller Special Tooling Requirements
SUPPLIER MATERIAL QUALITY REQUIREMENT CODES

Forms

- QA-F007 Supplier Request for MRB (SR-MRB)
- QA-F009 Supplier Purchase Order/Build Readiness Review
- QA-F012 Supplier Consent to Ship Checklist
- SC-F006 Process Control Detail Plan

8.0 ACRONYMS

<table>
<thead>
<tr>
<th>Acronym</th>
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<tr>
<td>AIE</td>
<td>Acceptance Inspection Equipment</td>
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<td>AQL</td>
<td>Acceptance Quality Level</td>
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<td>ASL</td>
<td>Approved Supplier List</td>
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<td>ASQ</td>
<td>American Society of Quality</td>
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<tr>
<td>BRR</td>
<td>Build Readiness Review</td>
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<td>CAR</td>
<td>Corrective Action Request</td>
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<td>CARC</td>
<td>Chemical Agent Resistant Coating</td>
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<td>WARP</td>
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It is the responsibility of the reader to review the changes to this document. Please contact the document Owner for further clarification.

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<td>02/28/2020</td>
<td>Updated 18QC02, 18QC05, 18QC06. Replaces QA-REF-003</td>
<td>Troy Dawson</td>
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<td>1</td>
<td>04/13/2020</td>
<td>Deleted PCA references/Description, Updates made to 18QC06 including: Under Submission Requirements - added statement that suppliers modified drawing shall not be used, deleted bullets 1 &amp; 2, and Note 1. Changed NGIS to NG.</td>
<td>Troy Dawson</td>
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<td>04/21/2020</td>
<td>Added special in front of process and or a special process house approved in writing by Mesa Quality to 18QC08.</td>
<td>Troy Dawson</td>
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<td>08/28/2020</td>
<td>Revised 18QC01 further defined Supplier Types.</td>
<td>Troy Dawson, Jeff Buntin</td>
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