

Supplier Product Acceptance and Delivery Guide

SG-0101

10/02/2025

SQ FHR Manager

Northrop Grumman Aeronautics Systems

REVISION RECORD

| Revision | Revision | Revision | Revision | Revision | Revision |
|----------------|----------|----------|----------|----------|----------|
| New 9/21/04 | | | | | |
| 8/20/07 | | | | | |
| 1/31/11 | | | | | |
| 8/22/12 | | | | | |
| 7/13/15 | | | | | |
| 10/02/2025 | | | | | |
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Primary Change Summary

Mass re-write to match internal Desktop Instructions and align Supplier and QFE activities.

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FOREWORD

SCOPE:

To provide guidance for supplier activities in performance of Sector purchase order requirements. This guide is recommended for use by suppliers for End Item Acceptance (EIA) of hardware in preparation for shipment and/or Northrop Grumman EIA or surveillance activities and subsequent delivery.

This guide establishes a minimal series of organized steps that are necessary to assure supplier compliance with SQAR.

Reference use of additional procedures and/or specifications may also be required to assure complete task compliance.

GENERAL:

Supplier Quality (SQ) representatives are responsible for ensuring supplier product validation; this validation is achieved by monitoring/witnessing supplier's review of the purchase order, SQAR, associated technical information and applicable quality requirements. Additional tasks include but are not limited to: Evaluation by monitoring and/or witnessing supplier's performance at their facility of inspection practices, tooling and related activities, tracking of parts movement and status, constraint resolution; and provide technical assistance to resolve engineering issues and validation of supplier production prove articles, as it applies to first article and Interchangeability and Replaceability (I & R) product conformance.

Supplier inspection of product shall be verified for compliance to purchase order requirements by following the series of organized steps outlined in this document as applicable to specific program and product requirements.

PRODUCT VERIFICATION

At a minimum, the following items Shall be reviewed during every EIA.

1. Purchase order:

- a) Clauses
- b) SQAR Code
- c) Planning, as applicable (ex.: B-15, SWI, PCD)
- d) Inspection / Location / Ship to Address / Authorization to Inspect and Ship from an alternate location
- e) Project ID (PID)
- f) Engineering Revisions and any associated Special Instructions (e.g., ID, part label requirements, FAI submission, UID, etc.)
- g) Delivery Date

2 Engineering

- a) Drawing (Document and/or Model), QFE Validation that the correct part configuration has been produced. Verify that the produced revision matches the purchase order or provided engineering.
- b) For the F-35 program, the supplier should be able to demonstrate the model configuration downloaded after P.O receipt, as evidence of compliance. The supplier should also be able to demonstrate their receipt, control and configuration management of supplied datasets in accordance with the SQARSUP-0100.
- c) Planning, as applicable (ex.: B-15, SWI, PCD)
- d) Build-to-Print Package, Performance Specifications, Material and Process Specifications.

3. Peripheral requirements

RCI's, SMRRs, SCAR's, CAR's, FENR's, Deviations/Waivers (PAL/ATS)

4. FAI Review for compliance to SQAR and AS9102

5. Certification Review

- a) Material / Hardware Cert / ASPL Cert Requirements
- b) Verification that special processes are performed at an approved process house and that non- Destructive testing approvals are validated per the OASIS ASPL Website.

6. Product Visual Inspection 100%

- a) Damage
- b) ID
- c) Count
- d) Validate ATP complete / accepted, when applicable
- e) Characteristic Measurements (sample as required, witness)
- f) Stack up / Tin soldier (when applicable)
- g) Inspect for FOD
- h) Part representation to Engineering Drawing/Model
- i) Part Marking should be validated per drawing, specification, and purchase order requirements.

7. C of C – Shipper – SQAR

(Ex.: PO, Line Item, SMRR number, RC/I number, Serial number, Revision Level, and verification of the supplier's representative acceptance). If required, the NGAS QFE will stamp and date the documents once reviewed and accepted.

8. Rework/Repair/Replacement/Modified Items

Per SQAR paragraph 2.5h, indicate action taken on C of C and/or supplier packing slip.

9. Traveled Work/Provisional Acceptance

Packing slip shall note NGAS PAL (Provisional Acceptance Letter) number and TSMRR number. If required, the NGAS QFE will stamp and date the documents once reviewed and accepted.

COMMODITY SPECIFIC CRITERIA

These commodity specific criteria are to be utilized for product acceptance prior to supplier EIA or presentation for customer EIA or surveillance activities.

SQAR A: METALLIC RAW MATERIALS

- a) Verifies markings, finish, etc. as required by purchase order and/or specification requirements.
- b) Verifies dimensional configuration.
- c) Verifies material certification and test data is in compliance with the purchase order and specification(s).
- d) Verifies that material is uniform in appearance.
- e) Verifies specialty metals were procured in accordance with DFARS 252.225-7001.

Note: Remember that NDT processes performed at the mill do not need to be approved/listed on the ASPL.

Note: When NDT processes are performed to customer/ NGAS specifications, supplier verifies that approved processors and techniques were utilized to perform the testing

(Reference SQARSUP-0120 SQAR SUPPLEMENT FOR NONDESTRUCTIVE TEST (NDT) TECHNIQUE SUBMITTAL).

SQAR A or M: NON-METALLIC RAW MATERIALS (Sealants, Adhesives, Paint, etc.) –

- a) Verifies that the product was processed by a facility approved on the Qualified Products List (QPL) or Approved Product List (APL), as applicable.
- b) Verifies material certification and test data comply with purchase order and/or specification requirements.
- c) Verifies material is properly identified (material identification, shelf life, lot/batch number etc.) and packaged per purchase order/ material specification/ SQAR ,as applicable.
- d) Witnesses' production testing, as defined by specification

SQAR C : CASTINGS AND FORGINGS

- a) Measures and evaluates actual dimensional inspections to substantiate product conformance.
 - Hole location, quantities, tolerances, squareness, concentricity, parallelism, surface finish etc. must be evaluated.
 - Close tolerance dimensions less than or equal to +/- .005", diameter .001" tolerance or less, angles 1/2° or less, holes with "inline" requirements must be evaluated.
- b) Verifies Inspection media has a current calibration inspection identifier.
- c) Verifies Castings and forgings have documented buyer acceptance of qualification per specification(s), e.g. SP-G-012.
- d) Verifies applicable NDT procedures/techniques are utilized and approved per specifications and SQARSUP-0120 SQAR SUPPLEMENT FOR NONDESTRUCTIVE TEST (NDT) TECHNIQUE SUBMITTAL
- e) Verifies that periodic destructive testing is performed per applicable specification.
- f) Verifies that material certification and test data is in compliance with the purchase order and/or specification(s).
- g) Verifies Grain Direction is identified/maintained, as applicable.

SQAR E: FABRICATED PARTS (SHEET METAL) -

- a) Evaluates actual dimensional inspections to substantiate product conformance of the following applicable features:
 - Minimum Material Thickness (look for potential thin areas as a result of forming)
 - Linear Dimensions (per print/Mylar)
 - Joggles – Length, Depth and transition.
 - Angularity – Flanges, etc.

- Radii/Bend Radii (look for thinning/cracks)
 - Holes – Diameter, Pattern, edge distances, quantities, etc.
 - Tooling Locating Holes integral to part.
 - Chem-milling – patterns (orientation/sizes), thickness after milling, finish, allowance for machining instead of chem milling
 - Grain direction (when specified).
 - I & R Features (100% supplier inspection data for all features)
 - Overall plan form – Engr. Dwg/Mylar
 - Dimensions +/- .010 or less tolerances.
 - Identification per engineering/ SQAR at final inspection (Caution for opposite/identical looking parts and any required UID marking(s))
- b) Verifies inspection media has a current calibration inspection identifier.
- c) Verifies articles comply with applicable I&R requirements as directed by Purchase order, SQAR and/or engineering drawing.
- Note:** I&R features must be inspected 100% to the applicable I&R tooling. Sampling is not allowed when inspecting I&R features.
- d) When required by purchase order, verifies requirements as defined in QOS-0033, when applicable.
- e) Verifies specialty metals are procured in accordance with DFARS 252.225-7001.
- f) Verifies that deburring operations have been effective in providing an edge break to engineering requirements and Tooling tabs have been removed in compliance to engineering.
- g) Verifies that if laser cutting has been used to create the flat pattern, the process is approved per the engineering specification. If so, the alpha case has been removed by an allowable and consistent method.
- h) Verifies that any inspection media created for the purposes of inspection is controlled per the digital data manual (Calibrated, traceable, and stable).
- i) Angularity is often achieved via a secondary hand straightening operation. Verify that parts are being consistently formed by sampling a number of bend angles.
- j) Verifies the callout of stress relieve requirements when forming Titanium sheet metal.
- k) Verifies that allowable oils or coolants are being employed when forming titanium.

SQAR E: FABRICATED PARTS (MACHINED/CHEM-MILLED PARTS)

- a) Evaluates actual dimensional inspections to substantiate product conformance of the following applicable features:
- FC/ DC/ MC Features (as required by drawing)
 - I & R Features (100% supplier inspection data for all parts)
 - Grain Direction (procedure maintaining from raw material to finished part)

- Close tolerance dimensions less than or equal to +/- .005", diameter .001" tolerance or less, angles 1/2o or less, holes with "inline" requirements must be evaluated.
 - Radii
 - Parallelism
 - Flatness
 - Concentricity
 - Wall/ Floor/ Web Thickness
 - Run out/Mismatch
 - Holes – Diameter, location, in line/ close tolerances
 - Jig Locator Holes
 - Mold Line – Contour/interface (CMM)
 - Finish – Per engineering
 - Identification per engineering/ SQAR at final inspection (caution for opposite/identical looking parts)
 - Chem-mill masking/ quality maintained, i.e. pitting, finish, blowout, etc. Also, allowance for machining instead of chem milling
 - Visually verify that excessive heating has not occurred, i.e. oil canning, discoloration, etc.
- b) Verifies that inspection media has a current calibration inspection identifier.
- c) Verifies that the part restraining allowances are being adhered to during product inspection. Weight allowances and restrictions are outlined in the machining control specifications. Verifies that the correct target points are being used for the CMM inspection process.
- d) Verifies that part conductivity requirements are being adhered to. Possible conductivity grid inspection for first article parts to ensure no material degradation has occurred during machining.
- e) Verifies that no forming or straightening operations have been performed. Look for obvious signs of abuse (Clamp marks, warpage or other damage)
- f) When processing has occurred, verify that the supplier has captured all masking and paint scheme dimensions on the FAI.
- g) Verifies that the supplier has an inspection process to validate that all masking materials have been removed (Masking tape, plugs etc.) Critical that any instances of FOD left on the product after processing be identified and flowed back to the process house for immediate containment and corrective action.
- h) Verifies that only the allowable deburring and coolant materials have been used for machining titanium products.
- i) Verifies that articles comply with applicable I&R requirements, as directed by purchase order, SQAR and/or engineering drawing

Note: I&R features must be inspected 100% to the applicable I&R tooling, sampling is not allowed when inspecting I&R features

- j) Verifies that machined parts fabricated from castings or forgings are compliant to casting and forging requirements
- k) If bearings / bushings or inserts are installed, verify installation per drawing specification or procedure is followed: i.e. swaging, sealants, functional testing, correct tools utilized, etc.
- l) Verifies specialty metals were procured in accordance with DFARS 252.225-7001

SQAR F: MECHANICAL STANDARD PARTS / HARDWARE

- a) Verifies that parts have been produced by qualified and approved manufacturing facility (i.e., QPL/ APL/ ASPL, etc.), including in-house manufacture
- b) Verifies product has been acquired either directly from a qualified manufacturer or a distributor authorized by the qualified manufacturer, as applicable
- c) Reviews test reports for part compliance to specification, part traceability and part quantities
- d) Assures that a copy of the test report is included in the shipping data package and that the report references the part number and specification, when required.
- e) Verifies dimensions (shank, diameter, head protrusion, thread characteristics, etc.) and head marking per the applicable engineering as required.
- f) Verifies finish, lubrication, identification, part number, configuration and packaging, as required
- g) Verifies identification of packaging and part is per specification, including any required UID marking(s)
- h) Assures that, if a distributor provides articles, they have performed verification and testing, when applicable
- i) F-35 Program – Verifies that facilities used are per the Approved Manufacturer List for Standard Parts 2GNA00001

Note: Per SQAR, Northrop Grumman ASPL is not applicable to standard hardware (nuts, bolts, washers, etc.) that is ordered to military, federal, or industry specifications' ASPL is not applicable to Customer designed standard hardware (nuts, bolts, washers, etc.) listed in the F-35 Approved Manufacture list of Standard Parts.

Other Requirements:

- **Commercial/Vendor Part callouts:**
 - Engineering defined: Part numbers are loaded with applicable Manufacturers CAGE code assigned
 - Procurement of them: Procurement can go to the Manufacturer or Distributor
- **Company Standard Part callouts:**
 - Engineering defined: Company Standard part number. The approved

Manufacturers are listed on the actual Standard, or in some cases on an Approved Vendor List (AVL) (e.g. B-2)

- Procurement of them: Procurement can go to the Manufacturer(s) listed on the Standard or AVL and/or Authorized Distributor

- **Military/Industry Standard Part callouts:**

- Engineering defined: Military/Industry part number. For many of these Standards/Part numbers the approved Manufacturers are listed on a Military/Industry controlled QPL/QPD or QML.
- Procurement of them: Procurement can go to the Manufacturer(s) listed on the Military/Industry controlled QPL/QPD or QML, or their Authorized distributors.

SOAR F: ELECTRICAL STANDARD PARTS /HARDWARE –

- Verifies that parts have been produced by qualified and approved manufacturing facilities, (i.e., QPL/APL/ASPL etc.)
- Verifies product has been acquired either directly from a qualified manufacturer or a distributor authorized by the qualified manufacturer, as applicable
- Reviews test reports for part compliance to specification, part traceability and part quantities
- Assures that a copy of the test report is included in the shipping data package and that the report references the part number and specification, when required
- Verifies dimensions (connector pin configuration, keying, etc.) and workmanship per established specifications
- Assures that, if a distributor provides articles, they have performed component verification and testing, when applicable
- Verifies electronic discharge (ESD) controls and requirements, as applicable
- Performs external visual inspection of packaging and/or components for damage or irregularities that could indicate non-authentic parts.

SOAR H: STRUCTURAL ASSEMBLIES

General:

- Assures that all detail parts have a complete and acceptable First Article Inspection (FAI) prior to being used in an assembly, along with completed final inspection records.
- Verifies that the supplier can demonstrate that correct material, processing, assembly, testing and inspection have been performed on all products contained with the Bill of Material.
- Performs visual inspection of installation and orientation of detail parts, sub-assemblies and hardware. Verifies workmanship of the assembly.
- Verifies envelope and interface dimensions, as defined within the customer furnished engineering.
- If Key Characteristics are at the component level, demonstrates that they have been

validated prior to the assembly process. Validates variability reduction data to assure that proper controls are being maintained on detail/assembly Key Characteristics.

- f) Fixture controlled items are checked for proper installation, fit and clearances. Validates that control fixtures are maintained under calibration control and are current to calibration cycle.
- g) Verifies FOD/FOE controls effectively implemented, as applicable.
- h) Verifies specialty metals are procured in accordance with DFARS 252.225-7001.
- i) Review of non-conforming material documentation; verify that Level 1 Suppliers have independent MRB authority. However, if Supplier does not have MRB approval non-conforming material must be submitted to NGC MRB.
- j) Verifies that tools used for assembly or installation are as defined in the applicable engineering. The supplier should be able to demonstrate that a correct tool has been utilized for inspection validations, swaging, staking etc.
- k) Many engineering specifications require that personnel performing assembly operations be trained, evaluated and certified. The supplier should be able to provide training records for critical assembly operations (Click bond installations, push off testing etc.)

Subassembly/assembly, verifies:

- a) Special process(s) has been performed at the detail part level.
- b) Deliverable end item is identified in accordance with the purchase order, drawing, planning and SQAR requirements, including any required UID marking(s).
- c) I & R cycles are performed on details that are integral to the end item sub-assembly.
- d) Approved Test Procedures (ATPs) have been performed, and data requirements have been complied with, when required.
- e) Installed perishable/shelf-life items were within shelf-life limitations.
- f) Skin quality requirements have been complied with when required.
- g) Torque requirements have been established and met.

Note: The SQ representative may monitor elements of the assembly/subassembly/detail part, as the components are being manufactured or assembled.

SQAR I or N: FUNCTIONAL ASSEMBLIES

- a) Assures that all detail parts have a complete and acceptable First Article Inspection (FAI) prior to being used in the assembly, along with completed final inspection records.
- b) Verifies that the supplier can demonstrate that correct material, processing, assembly, testing and inspection have been performed on all products contained with the Bill of Material.
- c) Verifies envelope dimensions to the top assembly engineering.
- d) Monitors and/or witnesses functional test performance per customer approved ATPs, as required by specification.
- e) If Key Characteristics are at the component level, demonstrates that they have been validated prior to the assembly process. Validates variability reduction data to assure

- that proper controls are being maintained on detail/assembly Key Characteristics.
- f) Assures that cure dates are stamped on assemblies, when specified by engineering requirements.
 - g) Visually inspects the assembly, check all markings - including any required UID marking, identification, lock wiring etc.
 - h) Assures cleaning and packaging practices are compliant to applicable specifications.
 - i) Verifies that bonding agents, fluids, sealants, etc. are certified, within shelf-life cycle and compliant to specifications.
 - j) Verifies that the supplier can demonstrate that Fixture controlled items are checked for proper installation, fit and clearances. Validates that control fixtures are maintained under calibration control and current to calibration cycle.
 - k) Review of Nonconforming material documentation; verify that Level 1 Suppliers have independent MRB authority. However, if Supplier does not have MRB approval nonconforming material must be submitted to NGC MRB.

**SQAR J or N: ELECTRONICS ASSEMBLIES, SUB-ASSEMBLIES
EQUIPMENT/ (AVIONIC SYSTEM)**

- a) Verifies envelope dimensions to top assembly drawing.
- b) Verifies and/or witnesses acceptance testing on unit(s) to assure compliance to customer Approved Test Procedure (ATP), as required.
- c) Performs visual inspection of connectors, hardware, lock wiring, painting, workmanship per applicable specifications, marking and nameplates.
- d) Verifies that the supplier can demonstrate electrostatic discharge (ESD) controls and requirements, as appropriate.
- e) Verifies that the supplier can demonstrate that all required functional testing has been accomplished (i.e. burn- in, environmental testing, re-screening etc.).
- f) Verifies that the supplier can demonstrate that review and documentation for all engineering deviation/ waiver requests, letters of provisional acceptance, etc.
- g) Verifies evidence of buyer qualification acceptance on electronic components, as required.
- h) Assures supplier tamper proofing is applied to Line Replaceable Units (LRU's), as applicable.
- i) Verifies that supplier software and software quality system approvals are current, as required.
- j) Review of Nonconforming material documentation; verify that Level 1 Suppliers have independent MRB authority, if applicable. However, if Supplier does not have MRB approval non- conforming material must be submitted to NGC MRB.

SQAR L: COMPOSITE DETAIL PARTS (HONEYCOMB DETAILS/ASSEMBLIES)

- a) Assures that all detail parts have a complete and acceptable First Article Inspection (FAI) prior to being used in the assembly, along with completed final inspection records.
- b) Verify all raw materials procured from required facilities and meet specifications.
- c) Verify ply, core and ribbon direction conform to engineering drawing.
- d) Assures that core splices are flush to surface, are not mismatched, that width and workmanship meets specification requirements.
- e) Verify core cell configurations for size, distortion, heavy burrs/ rollover, crush, buckles, node separation and/or tears are consistent with limits established by applicable specifications.
- f) Verify Check fixture-controlled items for proper trim and contour, in restrained and unrestrained conditions as established by specification limits.
- g) Verify bonding agent certification and shelf life.
- h) Verify cure temperatures and times per specification(s)
- i) Verify cure cycle tabular data in addition to graphical representation when performing first article inspection and/or conducting special process Audits.
- j) Verifies that the supplier can demonstrate that inspection media is undercurrent calibration cycle control and properly identified.
 - k) Visual - Assure core splices are flush to surface, no mismatches, within specification. Indentations, protrusions, steps, wrinkles, folds, pitting, pinholes, warpage, waviness, starved/excess resin conditions, contamination, etc. (Part of Engineering Requirements)
- l) Audit compliance to Composite Manufacturing and Finish Specifications for measurable features, Such as paint and primer thickness and sealant thickness.
- m) Planning validations (Part of Engineering Requirements) leak check, material out times.
- n) Verify that a Dry/Wet Tape Test has been performed per Engineering Specification for Finish

SQAR L: NON-METALLIC DETAIL PARTS

- a) Verifies that the manufacturer is listed in the QPL/ ASL/ ASPL, as applicable to specification.
- b) Verifies that the shelf life of the product is in compliance with the purchase order and specification limits.
- c) Validates configuration and engineering dimensions per the applicable specification or engineering data.
- d) Verifies product identification – including any required UID marking, with special emphasis placed upon proper specification number, cure date, and/or expiration date information.
- e) Verifies that all required testing has been satisfactorily completed per specification requirements.

SQAR Q: TOOLING

Verifies that supplier made tooling complies with the Supplier Tooling Manual. Refer to

the Supplier Tooling Manual, section 7 for tooling acceptance criteria.

SQAR T: NO REQUIREMENTS

No quality system requirements are applicable. Normally for non-deliverable material and Government and/or Customer furnished equipment.

SQAR W: CUSTOM/ MODIFIED OFF THE SHELF –

Assemblies and sub-assemblies that consist of commercial off the shelf (COTS) catalog items that are uniquely configured/ assembled for a particular program and application, that are not sold to the public in this configuration.

FIRST ARTICLE ACCEPTANCE REQUIREMENTS

The first article acceptance criteria will be determined by the SQAR revision requirements at the time of the Purchase Order placement.

DIGITAL MEDIA

1. General:

- a. The supplier is required to declare and demonstrate the use and source of all digital data used during the manufacturing and inspection operations. Refer to the Supplier Quality Assurance Requirements (SQAR) Supplement for the Control and Use of Digital Datasets for specific requirements, [SQARSUP-0100](#).

1. Specific:

- a. Demonstrates source and type of supplier utilized digital media (disc, tape, etc.) that was used for manufacturing or inspection of parts.
- b. Verifies that customer furnished digital media is controlled and/or released in accordance with specific program requirements.
- c. Demonstrates that media used for product acceptance is independently generated from engineering data and when required, that it shows objective evidence of customer acceptance, as well as supplier acceptance.
- d. Demonstrates that approved data for product acceptance is being used.
- e. Demonstrates that FAI documentation references use of customer supplied digital data, as required.
- f. Demonstrates use and/or request for use of technical data, via

Numerical Data Request (NDR), Inspection Data Request (IDR), Numerical Model Data, Quality Assurance Inspection Data (QAID) to produce and inspect the finished product.