

# Quality Systems Procedure Sensors North America Supplier Quality Manual QP-06000

FAA APPROVAL REQUIRED PRIOR TO RELEASE

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**Approval procedure:** initial release and revision approvals will be done through a custom document via DocSign. A copy of the digital approvals from DocSign will be appended to this document.

**Procedure Control:** this procedure will be maintained and approved through the Document Control Center located in Gilbert, Arizona Sensors.

## Revision History

Revision	Date	Section	Description
-	10/15/2014	All	Initial release, effective date 01/01/2015
A	12/08/2014	Supplier Requirements	Remove 9b which was a note used as a reminder to insert a form.
		Product Specific Quality Clauses	Revised wording of Q9 to match customer requirements for flight safety labeling.
		Supplier Requirements	Added 2. B. iii requiring expiration date be included on age controlled material.
		Changes in Design Materials and Process	Modified wording of 4 to include AS9102 compliance.
		Problem Resolution	Added 3, A, vi to define timing required for RMA to be provided from supplier.
		Product Specific Quality clauses	Revised wording of Q2 to define applicability to machined parts only.
		Product Specific Quality clauses	Changed Q5 from Argo approved to Eaton approved.
		Product Specific Quality clauses	Added Q11 for items that will require the use of Boeing approved suppliers.
B	10/8/2015	Business Hold	Revised section to match QP-17002.
		Quality System Requirements	Revised 2 and 3 to match QP-17002.
		Product Specific Quality clauses	Added Q12 for compliance to DFARS 252.225-7014.
		Product Specific Quality clauses	Added Q13 for compliance to The Buy American Act.
		Product Specific Quality clauses	Added Q14 to clarify DIP requirements for the Gilbert Sensors site.
		Approvers	Added Cody Owens
			Added Manuel Reyna
		Product Quality	Added Visual Acceptance Criteria QP-20020
C	11/20/2015	Supplier Requirements	Added #3 stating that models, samples, sketches, etc are for reference only.

Revision	Date	Section	Description
D	3/18/2016	Approvers	Changed author to Jeff Chubbs
		Approvers	Removed Glenn Pont
		Approvers	Removed Bryan Thomas
		Approvers	Removed Dan O'Connell
		Approvers	Added Charles Falardeau
		Supplier Requirements	Added #17 Obsolescence or End of Life
		Problem Solving Expectations	Added the use of the 8D format and additional problem solving methods.
		Problem Resolution	Extended implementation time frame for permanent corrective actions from 10 to 30 business days.
		Non-Conforming Materials	Added that supplier shall notify Curtiss-Wright within 24 hours of discovery that nonconforming materials have been delivered to Curtiss-Wright.
E	1/9/2017	Non-Conforming Materials	Added that supplier shall include approved deviation request form with delivery of affected product.
		Counterfeit Parts Prevention	Added #3
		Packaging and Shipping Requirements	Added #4 and #5
		Misdirected Shipments	Added as a new section.
		Control Of Sub Tier Suppliers	Added flow down requirement of this document to sub tier suppliers.
		Supplier Assessments	Revised section to match QP-17002.
		Supplier Requirements	Added #5
		Supplier Requirements	Revised #13 to include NADCAP requirement for source control items and processes mandated by customer contract.
		Product Specific Quality Clauses	Removed Q6. (See Supplier Requirements #5)
F	9/22/2017	Packaging and Shipping Requirements	Revised #5 to specify machined components cannot have part-to-part contact.
		Supplier Assessments	Added reference to QP-17002.
		Supplier Requirements	Added #5c
		Product Specific Quality Clauses	Revised Q3, Q5 and Q11 Added Q15, Q16, Q17, and Q18

Revision	Date	Section	Description
G	4/6/2018	Approvers	Removed Manuel Reyna
		Approvers	Added Fernando Dorantes
		Approvers	Removed Director of Materials-Cody Owens
		Approvers	Added Senior Supply Chain Manager-Denise Bridges
		Approvers	Removed Alan Weber
		Approvers	Added Dan O'Connell
		Approvers	Removed Charles Falardeau
		Approvers	Added Graham Macdonald
		Counterfeit Parts Prevention	Added reference to AS5553
		REACH and RoHS Compliance	Added new section
		Delegated Inspection Authority / Source Inspection	Revised #3
		Product Quality	First Article Inspection – added requirement for suppliers to provide major diameter, minor diameter and pitch diameter for threaded features.
		Product Quality	Non-Conforming Materials – added requirement that suspect, nonconforming, or unprocessed items must be identified and packaged separately.
		Product Quality	Delivery Requirements – added requirement that suspect, nonconforming, or unprocessed items must be identified and packaged separately.
		Product Specific Quality Clauses	Added Q15 a – d
		Product Quality	<p>From: The Seller shall provide notification of nonconforming material/ parts that have been delivered to SENSORS NA that may affect the eventual fit, form or function of Sensors NA products. Notification must be received within 24 hours of discovery of the nonconformance. This Notification will include at a minimum</p> <p>To: The Seller shall provide notification of any nonconforming material/ parts that have been delivered to SENSORS NA. Notification must be received within 24 hours of discovery of the nonconformance. This Notification will include at a minimum</p>

Revision	Date	Section	Description
H	3/1/2019	Approvers	Removed Alex Nykamp
		Approvers	Added Michael Whitehouse
		Approvers	Removed Graham Macdonald
		Counterfeit Parts Prevention	Added reference to AS6174, AS6496, AS6801, and AS6171.
		Foreign Object Debris / Damage (FOD) Prevention	Revised wording to allow suppliers to use NAS-412 as a guide for FOD programs.
		Changes in Design Materials and Processing	Added #5
		Supplier Performance	Removed reference to monthly delivery of supplier scorecard.
		Supplier Requirements	Edited limited life requirement in 2b to mirror incoming inspection procedure.
		Supplier Requirements	Added helium to #8
		Supplier Requirements	Added #19
		Product Quality	Added inspection plan requirement to #1
		Product Specific Quality Clauses	Removed Q12. Revised Q17. Added Q19, Q20 and Q21
J	8/9/2019	Approvers	Added Jeff Troutner
		Safety and Ethics	Added new section to align with AS9100D
		Product Quality	Revised grammar in paragraph 4a
		Product Specific Quality Clauses	Revised Q15 to included proper paragraph references in ASQR-01
		Product Specific Quality Clauses	Added Q22 and Q23
K	11/8/2019	Approvers	Removed Fernando Dorantes Added Omar Chavez
		Supplier Requirements	Revised #6 Traceability to Source of Origin
		Product Quality	Revised #3.a.vi to allow return of nonconforming product to a supplier without an RMA.
		Product Quality	Added #12 Inspection Tools and #13 Contract Review

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## **Purpose of Procedure**

The purpose of this manual is to communicate Sensors North America quality requirements and expectations to suppliers.

The products being procured are used in commercial and military aerospace platforms, medical devices and satellite applications. It is key Sensors NA suppliers understand the criticality of the product quality required.

It is our intent to do business with suppliers who are able to provide parts, materials, processes, and services consistently to specifications, at a competitive price, and in accordance with the defined delivery schedule. The manual is intended to aid suppliers in their understanding of requirements regarding specific management, communication, and reporting processes.

## **Scope of Procedure**

This procedure applies to all suppliers who provide materials, equipment, and services to Sensors North American sites.

## **Quality System Requirements**

1. Suppliers are encouraged to develop foundational quality systems which provide for continuous improvement and emphasize defect prevention while reducing variation and waste.
2. AS9100, ISO9001 or ISO17025 certifications are required for new suppliers who provide materials or services listed in a BOM, unless approved otherwise by the Host Site Quality Manager.
3. NADCAP certifications are required for suppliers who provide special processes as defined by PRI-SAE QPL listing (ref: [www.eauditnet.com](http://www.eauditnet.com)).
4. Suppliers are required to notify Sensors North American procuring sites of any changes to their Quality System accreditations resulting in system disqualification or downgrading. Failure to do so may result in supplier being disapproved.

## **Record Retention**

1. Records retained by the supplier or its sub-tiers related to testing, inspection and traceability and not otherwise delivered with a purchase order, shall be retained indefinitely.
2. Other records relevant to the procurement and not otherwise delivered with a purchase order, shall be retained indefinitely.
3. Storage conditions shall allow the records to remain legible, readily identifiable and retrievable.
4. Supplier shall provide Sensors NA all records relevant to a purchase order when unable to retain records at their facility for the required record retention period.

## **Right of Entry**

1. Sensors, its customers, and government officials reserve the right to verify the quality and delivery of all materials and services included in this procurement at Supplier's facility.

## Approved Supplier List

1. Sensors will only purchase materials, equipment, and services from suppliers listed in the “Approved Supplier” list.
2. Sensors will evaluate and select suppliers based on their ability to supply materials, equipment, and services to specified requirements.

## Counterfeit Parts Prevention

1. In response to the 2012 National Defense Authorization Act, Section 818 and in order to help mitigate the risk of obtaining counterfeit electronic/electrical parts, Curtiss Wright will only purchase electronic/electrical parts with a distributor from those suppliers who are can provide traceability to an authorized Original Components Manufacturer (OCM) for each item/part number.
2. Required With Shipment: Manufacture (MFR) Certificate of Conformance (C of C), as well as, distributor (C of C) is required depending on the supplier. If the supplier is the manufacturer, then the MFR C of C is all that is needed. If a distributor is the supplier, then the distributor C of C is also required. The MFR C of C must have the distributor’s information on it.
3. Suppliers shall develop and implement a counterfeit parts control plan that documents its processes used for risk mitigation, disposition, and reporting of counterfeit parts. The plan shall meet the intent of AS5553, AS6174 (Counterfeit Material), AS6496 (Authorized Distributor), AS6801 (Independent Distributor), and AS6171 (Test Methods). Suppliers shall disclose to SENSORS NA if they are not an authorized source of supply.
4. All mechanical, electro-mechanical, and material commodities are subject to the same requirements for counterfeit prevention.

## REACH and RoHS Compliance

1. EU Regulation No. 1907/2006 concerns the Registration, Evaluation, Authorization and Restriction of Chemicals (REACH) and establishes a European Chemicals Agency. All companies producing, importing and using chemicals in Europe are obligated to adhere to REACH regulations.
2. The RoHS Directive will ban placement into the EU market of new electrical and electronic equipment containing more than designated maximum allowable levels of lead, cadmium, mercury, hexavalent chromium, polybrominated biphenyl (PBB) and polybrominated diphenyl ether (PBDE) flame retardants, effective July 1, 2006. Reference RoHS Directive 2002/95/EC.
3. Suppliers will be required to complete REACH and RoHS declarants as part of Sensor’s evaluation and re-evaluation process.

## Safety and Ethics

1. Suppliers shall ensure that their employees are aware of:
  - a. Their contribution to product or service conformity
  - b. Their contribution to product safety
  - c. The importance of ethical behavior



## **Conflict Minerals Compliance**

1. Seller agrees that it will (1) provide Buyer with the information Buyer in its sole discretion deems necessary to comply with the requirements of Section 1502 (“the Provision”) of the Dodd-Frank Wall Street Reform and Consumer Protection Act (“Act”) (Pub. L. 111-203, 124 Stat. 1376 (July 21, 2010)) relating to disclosure and reporting obligations concerning the use of “conflict minerals” during each calendar year on or before February 1st of the next year and (2) undertake due diligence on its supply chain and any other measures as necessary to obtain the information necessary for Buyer to comply with such requirements.

## **Affirmative Action in Federal Contracting**

1. Curtiss Wright Controls, Sensors is a federal contractor which complies fully with Executive Order 11246, as amended, and the applicable regulations contained in 41 C.F.R. Parts 60-1 through 60-60; 29 U.S.C. Section 793 and the applicable regulations contained in 41 C.F.R. Part 60-741; 38 U.S.C. Section 4212 and the applicable regulations contained in 41 C.F.R. Part 60-250 and/or 60-300; and 29 C.F.R. Part 471, Appendix A.

## **Slavery and Human Trafficking**

1. Curtiss-Wright Corporation requires that all Supplier/Subcontractor’s must complete an annual certification that the production of materials incorporated into any product sold or otherwise provided to Curtiss-Wright Corporation and/or its subsidiaries complies with laws regarding slavery and human trafficking of the country or countries in which my firm does business. If you have not completed an annual slavery and human trafficking certification then please contact your Curtiss-Wright Corporation buyer.

## **Foreign Object Debris / Damage (FOD) Prevention**

1. Supplier shall maintain a FOD prevention. National Aerospace Standard NAS-412, Foreign Object Damage/ Foreign Object Debris (FOD) Prevention may be used as a guide.
2. By delivering items to SENSORS NA, supplier shall be deemed to have certified that such items are free from any foreign materials that could result in FOD.

## **Packaging and Shipping Requirements**

1. Supplier shall ensure the use of adequate protective measures to prevent damage during transportation and storage, including application of packages and wraps, cushioning, and complete identification marking of unit, and intermediate and exterior containers
2. Products shall also be identified per specification and/or drawing requirements when applicable. Mil-STD-130 may be used as a guide.
3. No egg carton containers made of a paper base shall be used to ship product to Sensors NA.
4. The use of Styrofoam chips (or peanuts) is no longer an acceptable packaging method.
5. Machined components shall be packaged in such a way so as to prevent damage due to part-to-part contact. NOTE: Packaging in individual plastic bags does not provide adequate protection.

## **Misdirected Shipments**

1. Definition: External delivery that does not arrive to contracted destination at fault or error of supplier. It is the responsibility of the supplier to refer to each PO header SHIP TO ADDRESS as it may vary.
2. Misdirected supplier deliveries are costly and have potential to drive delays to Curtiss-Wright's factories and valued customers. Suppliers will be subject to incur all shipping and handling costs incurred by Curtiss-Wright due to misdirected shipments without prior Supplier notification. This includes both inbound and outbound carrier costs including expedite fee's as required and are subject to a "package redirect fee" up to 100\$. However, there is no monetary limitation on recovery of costs incurred by Curtiss-Wright for any correction of repackaging, repacking, and remarking deficiencies regarding hazardous materials.

## **Control Of Sub Tiers Suppliers**

1. The supplier has the responsibility to flow down all applicable requirements contained within this Supplier Quality Manual as well as those found on all purchase orders, drawings, and specifications received from SENSORS NA.

## **Delegated Inspection Authority / Source Inspection**

1. Where required by purchase order the supplier will assign a source acceptance delegate, who assumes full responsibility for all aspects of part conformity. The Delegate signs statement, "This shipment accepted by SENSORS NA Supplier Quality Assurance Delegate."
2. Where required by purchase order Source Inspection will be required by a government representative. For those orders:
  - a. Government Inspection is required prior to shipment of item(s) from Seller's facility. Upon receipt of the procurement, Seller shall promptly:
    - i. Notify a Government Representative (or if none, the nearest Army, Navy, Air Force or Defense Supply Agency Inspection Office) so that arrangements can be made for Government Inspection;
    - ii. Provide a copy of the procurement contract to the Government Representative.
  - b. In the event the Government Representative cannot be located, the Sensors NA buyer should be notified immediately.
3. Where required by purchase order, Source Inspection will be performed by Sensors NA, a customer representative, or a delegate.
  - a. Source inspection will be performed at Seller's facilities during the manufacture, test, and/or inspection of items furnished by those purchase orders.
  - b. Sensors NA reserves the right to conduct (or waive) surveillance of work-in-progress, inspection and/or test at points selected by Sensors NA quality.
  - c. Source Inspection shall not relieve the Supplier's requirement to fully comply with the specifications and all of the terms and conditions of the Contract/Purchase order
  - d. Source Inspection will be scheduled and coordinated with the supplier. The supplier shall furnish reasonable access to relative contract, design and specification data, and the necessary equipment and space to perform any such inspections.

**Dock to Stock**

1. Suppliers may be nominated for a dock to stock receiving program for Sensors NA sites.
2. Where nominated, QP-10011 will be utilized to qualify the supplier for dock to stock.

**Changes in Design Materials and Processing**

1. Supplier shall not make any changes in product design, material or processing, or in the methods of fabrication, without prior approval in writing by SENSORS NA.
2. For catalogue or COTS items written notification to SENSORS NA is required for any changes in product design, material, processing, or in the methods of fabrication.
3. Supplier shall use QF-06000-1 Request to Change Form to obtain approval prior to any changes being made. Tooling moves to an alternate supplier manufacturing facility may require a Quality System audit of the new facility. Suppliers are prohibited from moving tools without prior notification and approval from SENSORS NA.
4. When sub-tier suppliers are changed, SENSORS NA shall be notified in writing. A first article in compliance with AS9102 will be required where sub-tier suppliers are changed.
5. When sub-tier suppliers have been acquired by another entity, sold to another entity, or plan to cease operation, SENSORS NA shall be notified in writing.

**Supplier Assessments**

1. Per QP-17002, two types of supplier audits will be utilized by SENSORS NA where a supplier provides materials listed in a BOM or calibration and test services: (a) on-site supplier audit or (b) a supplier self-audit. Auditing of a supplier who does not provide materials listed in a BOM, equipment, or other services may be required at the discretion of the Quality Manager.
2. On-site supplier audit:
  - a. This type of audit may be performed when required by contract, to review quality concerns, to review critical components, or at the request of another department.
  - b. Must be performed for machining suppliers not yet in QC Vendors that will be producing CW designed components or CW customer designed components. This requirement may be waived and replaced by a supplier self-audit with the approval of the Host Site Quality Manager.
  - c. QP-17003 will be the document used for on-site supplier audits.
3. Supplier self-audit:
  - a. Required when the supplier's AS9100, ISO9001, NADCAP, or equivalent certification expires. When possible, the self-audit form will be sent to the supplier in advance of their certificate's expiration date.
  - b. Can be performed as an alternative to an on-site supplier audit except for machining suppliers not yet in QC Vendors that will be producing CW designed components or CW customer designed components
  - c. QP-17004 will be the document used for supplier self-audits.

## Supplier Performance

1. Performance Reporting will be delivered to suppliers via the Supplier Scorecard.
2. Supplier Scorecards will be delivered to those suppliers to SENSORS NA which fall into the top 80% of spend and top 80% of volume received on an annual basis. Supplier scorecards will also be sent to those suppliers the quality or procurement teams deem underperforming.
3. Suppliers who are provided a Supplier Scorecard will be expected to deliver a continuous improvement report where their month on month OTD or PPM degrades.
4. Sensors NA will provide assistance to suppliers having trouble meeting performance levels and specifications set by SENSORS NA. SENSORS NA will assist in:
  - a. Resolution of critical issues
  - b. Continuous improvement
  - c. Training

## Disapproved or Business Hold Status

1. A supplier will be disapproved and placed on business hold under the following conditions:
  - i. The supplier's "Approved Until" date has expired.
  - ii. The supplier's quality or delivery performance is considered unacceptable.
  - iii. The supplier has had no physical receipts for a period of three (3) calendar years.
  - iv. Other mitigating factors.
2. When a supplier is disapproved in one Sensors site, the disapproval will apply to all Sensor's sites.

## Supplier Requirements

1. Raw Material
  - a. Material Contamination
    - i. Mercury
      1. The supplier shall ensure that material furnished is free from mercury contamination. Mercury-bearing instruments and equipment are potential sources of mercury contamination and so, shall not be used in the processing of parts.
    - ii. Zinc or cadmium
      1. Seller shall not use any zinc or cadmium processes on part(s) or assemblies supplied unless required by drawing.
2. Age Control
  - a. Cured items with limited life
    - i. Cured items that have a limited life (i.e., "O" rings, gaskets, seals), on which the cure date has exceeded 25% of the shelf life shall not be shipped to Sensors NA, or if at the time of receipt at Sensors NA, more than three months have passed since the date of cure.
  - b. Limited Life Items
    - i. Seller shall not ship to Sensors NA material on which more than 20% of the shelf life has expired at the time of receipt by Sensors NA.
    - ii. Seller must specify the name of the manufacturer and date of manufacture on product certification.

- iii. Seller must specify the expiration date of product supplied on the Certificate of Conformance.
3. Any models, samples, sketches, emails, verbal communications, etc., provided by Curtiss Wright are for REFERENCE only. Materials that do not meet applicable drawings and/or specifications will be considered non-conforming.
4. Certificate of Conformance required from Supplier
  - a. Seller shall provide a Certificate of Compliance (or equivalent) with each shipment of parts signed by a legally authorized representative of the Sellers organization.
  - b. The Certificate of Conformance shall include the following:
    - i. Sensors NA part number and quantity;
    - ii. Part revision level;
    - iii. Military/Government/ Industry Specification Number (if applicable);
    - iv. Description of material or services
    - v. Serial number of lot/batch number (if applicable);
    - vi. Sensors NA Purchase Order or Subcontract number;
    - vii. Materials supplied must meet applicable drawings and/or specifications (Documentation must be on file to support this statement, and is subject to Sensors NA examination upon request). Include all certifications
    - viii. If the Supplier is a Distributor, then a record of actual Manufacture Certification must also accompany the shipment.
5. Actual Inspection Data Required
  - a. The Seller shall provide certified actual inspection results with each shipment. 100% inspection shall be performed on all key characteristics identified.
  - b. SENSORS NA shall verify conformance of this inspection data to specifications upon receipt of each shipment including records or documentation required by the Purchase Order for lot control, testing, etc.
  - c. The use of statistical techniques for product acceptance shall be communicated to SENSORS NA.
6. Traceability to Source of Origin
  - a. The supplier shall establish and maintain a system that ensures traceability of material throughout manufacturing, special processing, and delivery to Curtiss-Wright. The traceability system shall provide sufficient means to maintain current revision, specification, and quality requirements from raw material through finished product for all materials and processes used by the supplier and its sub-tier suppliers.
  - b. Valid traceability links between documentation may include:
    - i. Curtiss-Wright PO number
    - ii. Supplier work order number
    - iii. Heat lot number for raw material
    - iv. Lot or batch number
    - v. Serial numbers
  - c. Proper documentation that can be linked from finished product to raw material and processes shall be provided to Curtiss-Wright with each delivery.

**7. Quantitative Test Reports Required**

- a. Seller shall provide with each shipment of material:
  - i. Authenticated, quantitative test reports showing the degree of compliance with physical property specifications;
  - ii. Certification of chemical composition

**8. All Welding and Brazing Suppliers**

- a. Supplier shall provide with each shipment of material, Quantitative Test Reports as listed above for up to and including the following listed supplies:
  - i. Wire (Braze)
  - ii. Flux
  - iii. Argon
  - iv. Slugs (Braze)
  - v. Oxygen
  - vi. Acetylene
  - vii. Rings (Braze)
  - viii. Helium

**9. Calibration Certificate**

- a. A Calibration Certificate shall be supplied for all measuring and test equipment.
- b. Indicates readings taken before and after calibration, along with extent of adjustments made.
  - i. If the readings are outside of the instruments measurement tolerance, Sensors shall be notified immediately.
  - ii. If readings cannot be taken before calibration due to disrepair of the equipment, the certificate shall so state.
  - iii. States that the standards used to obtain readings are traceable to Canadian (NRC), American (NIST) or recognized international standards.
  - iv. Is signed by an authorized representative of the supplier.

**10. Electrostatic Discharge (ESD)**

- a. For all devices furnished which are considered by SENSORS NA to be susceptible to damage from electrostatic discharge. The Seller shall:
  - i. Take the necessary precautions while handling and packaging the deliverable product to prevent damage;
  - ii. Ensure device leads are electrically shorted together by non-corrosive conductive foam or other suitable methods;
  - iii. Ensure the items are encased in electrically static dissipative tubes, carriers, or bags for shipment;
  - iv. The packaging is labeled to indicate that it contains electrostatic sensitive parts.

**11. Non-conventional Machining**

- a. Approval is required from SENSORS NA prior to performing any EDM. (Electrical Discharge Machining) processes on any machined components.

**12. Tooling**

- a. When a tool (die cast tool, stamping tool, molded rubber tool) has reached its estimated life and the supplier is requesting a new tool, the Supplier must submit sample part(s) to SENSORS NA Purchasing for review along with an explanation identifying the areas where the tool needs to be replaced.
- b. Purchasing will then forward to Quality for review. If the tool is used to produce castings then a casting and a machining sample will be required.



- c. When a new tool is produced, the Supplier must identify the tool with the following: SENSORS NA part number, month and year of completion. Upon completion of the tool, the supplier must submit a First Article Report listing all characteristics. The part must be fully processed per SENSORS NA drawing requirements.

#### 13. Special Processing

- a. All suppliers and sub tier suppliers performing special processes as defined by PRI-SAE QPL listing (ref: [www.eauditnet.com](http://www.eauditnet.com)) shall be NADCAP certified to that process.
- b. Items that are source-controlled or sub-tier suppliers that are customer-mandated shall be subject to the same requirements.

#### 14. Test Specimens and Results when required with each batch

- a. The supplier shall process a test specimen when required by PO and is required to forward the specimen and the test results, showing the degree of compliance to the applicable specifications, to Sensors NA.
- b. A weld specimen is required when a new weld scheduled is being used.

#### 15. Test Specimen and Results required

- a. The Seller shall provide, with each test piece, authenticated quantitative test reports showing the degree of compliance with the applicable specification.

#### 16. Certificate of Compliance for Test Pieces Required

- a. Seller shall provide a Certificate of Compliance with each test piece under this procurement, signed by a legally authorized representative of the supplier's organization, stating the following:
  - i. Material type
  - ii. Material section number
  - iii. Purchase order number
  - iv. Lab sample I.D number
  - v. Sensors NA process schedule number (if applicable)
  - vi. Applicable specification and revision level

#### 17. Heat Treat

- a. Heat treating, stress relief, and annealing are special processes. The Seller shall make available upon request documented heat run data to Sensors NA.

#### 18. Obsolescence or End of Life

- a. Where a supplier chooses to obsolete or take a product to end of life, Curtiss Wright shall be notified in writing 6 months in advance of the occurrence.
- b. This notice shall include recommended replacements and the ability for Curtiss Wright to make a last time buy.

#### 19. Passivation

- a. Passivation is required to be performed on all detail components manufactured from 300 and 400 series stainless steel material. The passivation shall be performed IAW AMS2700 unless otherwise specified on the drawing.

## Product Quality

### 1. First Article Inspection

- a. First Article Inspection applicability is defined by SAE AS9102, section 4.
- b. Suppliers are required to obtain approval for mass production parts prior to shipment through the First Article Approval process.
- c. The purpose of the First Article Approval process is to verify that a supplier's production process is capable of producing parts to meet SENSORS NA specifications.
- d. Suppliers shall conduct a First Article production run and produce parts utilizing normal production equipment, tooling and processes that would be used as in mass production. The Supplier will then submit sample parts from this First Article Production run for approval by SENSORS NA.
- e. Prior to submitting the First Article parts, suppliers shall submit inspection plans to their SENSORS NA buyer for approval. At a minimum, inspection plans will document features to be inspected, tools & gages to be used, and inspection frequency.
- f. Suppliers shall submit First Article samples for new parts or changes to existing parts, processes, drawings, manufacturing locations, sub-contractors, or materials, or cessation in manufacturing for two years.
- g. Requirements for the First Article submissions must meet AS9102 requirements at a minimum
  - i. Drawings
    - i. Each part drawing along with referenced specifications and drawings must be submitted with each First Article.
  - ii. Each dimension and note must be ballooned (numbered)
  - iii. Dimensional results
    - i. Suppliers must submit the First Article Inspection dimensional results on an AS9102 or equivalent report.
    - ii. A one piece dimensional layout is required for each mold, cavity, die and production line that produces a part.
    - iii. Dimensional results must be provided for all dimensions, notes and other specifications on the part drawing.
    - iv. For threaded features, dimensional results are requested for major diameter, minor diameter, and pitch diameter.
    - v. The dimensional layout must correspond to the ballooned drawing.
  - iv. Material certifications
    - i. Suppliers must provide evidence of compliance to material specifications through material and performance test results.
    - ii. Each First Article submission must be accompanied by a Material Certification report.
  - v. Samples
    - i. Suppliers may be required to submit up to 5 sample parts with each First Article Submission.
    - ii. Samples from tooling should be submitted for each mold or cavity
    - iii. Each sample part must have a tag indicating it is a First Article sample. The tag should include part number, revision level, date parts were produced, supplier name, and cavity number.



- h. No First Articles should be submitted to Sensors NA if any dimensions or test results do not meet part drawing requirements. Supplier shall make every attempt to implement corrective action for any out of spec condition. Suppliers shall contact SENSORS NA if they are unable to meet part drawing. SENSORS NA will then inform suppliers on required course of action.
2. Non-Conforming Materials
- a. The Seller shall provide notification of any nonconforming material/ parts that have been delivered to SENSORS NA. Notification must be received within 24 hours of discovery of the nonconformance. This Notification will include at a minimum
    - i. a clear description of the nonconformance
    - ii. the product number (customer's where required) and the quantity
    - iii. the serial numbers, batch numbers, date of manufacture, as applicable
    - iv. delivery date of the product
    - v. planned corrective action, with date for completion
    - vi. delivery of material or items that are believed to be suspect or nonconforming, or items being returned to SENSORS NA unprocessed, must be identified and packaged in such a way so as to prevent unintentional comingling with acceptable product.
  - b. Supplier shall use QF-06000-2 Supplier Deviation Approval Request to obtain approval for deviations prior to delivery. A copy of the approval shall be submitted with the delivery of the product to SENSORS NA. Failure to do so may result in product being returned.
3. Problem Resolution
- a. CAR Process
    - i. Upon receipt of nonconforming material SENSORS NA may issue a MRR (Material Reject Report). Nonconforming material can be found during incoming inspection, audit, assembly or warranty returns.
    - ii. If problems are found during pre-production fitting trials or are considered minor issues, SENSORS NA will issue a Quality Alert to the supplier describing the problem. This will be in the form of an email or letter.
    - iii. Return Material Authorization (RMA) may be provided for material that is defective or considered suspect and needs to be returned to the supplier.
    - iv. SENSORS NA reserves the right to sort suspect material to avoid shutdown of its production lines.
    - v. Within 24 hours of notification of defective parts through MRR, suppliers must:
      - i. Implement requirements of Normal Containment
      - ii. Inform SENSORS NA the plan to replace suspect material
      - iii. Identify short term corrective actions
      - iv. Send initial CAR responses
    - vi. Within 3 business days of receipt of an MRR, an RMA is required from the supplier. If no RMA is received within 3 business days, the buyer may return the product without the supplier's authorization.
    - vii. Within 30 business days of notification of defects suppliers must:
      - i. Define and verify Root Causes of defect and Escape
      - ii. Determine and Implement permanent corrective actions for Root Cause and Escape
      - iii. Verify and Validate permanent corrective actions

- viii. SENSORS NA will analyze the final CAR response and provide the supplier with a decision on closure of the CAR. CAR responses will be Accepted, Conditionally Accepted or Rejected. Resubmission of the CAR response with discrepancies corrected is required within 5 days.
4. Problem Solving Expectations
- a. When SENSORS NA issues Corrective Action Requests (CAR's), suppliers are required to submit a formal response. At the discretion of the Site Level Supplier Quality Engineer, the CAR response may need to be submitted in an Eight Disciplines (8D) format. It is recommended to follow the requirements of AS13000 Problem Solving Requirements for Suppliers. If needed, SENSORS NA can provide a template. Below is list of information that is required to be included in the CAR response.
    - i. Problem Statement
      - i. Define problems in detail
      - ii. Identify "what is wrong with what"
      - iii. List SENSORS NA requirements concerning defect
      - iv. Identify when the problem started
      - v. List manufacturing dates of defective material
    - ii. Interim Containment Action
      - i. Define and verify Interim Containment Actions
      - ii. Provide daily sort results
      - iii. All stock locations should be purged of suspect stock
      - iv. Describe method of sorting
      - v. Validate effectiveness of ICA
    - iii. Root Cause Analysis
      - i. Define in detail the "true" root cause
      - ii. Verify the "true" root cause
      - iii. Address the Escape Point (Place in the process where the effect of the root cause should have been detected and contained)
      - iv. Use the 5 Why approach.
      - v. Additional problem solving methods are recommended and may be requested by SENSORS NA based on the nonconformance.
    - iv. Permanent Corrective Actions
      - i. Must address the root cause and the Escape Point
      - ii. Must be very detailed. Describe who will do what and how it will be implemented and when.
      - iii. Verify and validate the corrective actions. Describe in detail method of verification.
      - iv. Corrective actions must not cause any other problems
    - v. Prevent Recurrence
      - i. Modify necessary policies and procedures to prevent reoccurring problem
      - ii. Evaluate whether corrective actions can be implemented on similar products or processes.
  - b. Approval and closure of CAR Responses will be at the discretion of Sensors NA. All CARs will remain open until problem-solving requirements are met.

5. Containment
  - a. Suppliers are responsible for developing a process to protect SENSORS NA from receiving material that does not meet the quality requirements and specifications set by SENSORS NA. Suppliers must include at minimum elements of the following process of containment.
6. Controlled Containment
  - a. Suppliers will be placed into Controlled Containment as a result of Sensors NA or its customers receipt of defective material. Suppliers will be required to take immediate actions to cease shipping of defective material. These actions include:
    - i. Sending 100% certified parts for all shipments to SENSORS NA.
    - ii. Marking certified parts as agreed to by SENSORS NA.
    - iii. Sending certified replacement parts to replace suspect parts in-transit and in SENSORS NA inventory.
    - iv. Utilizing a Certified Part identification label to identify certified shipments.
    - v. Collecting daily sort data and reporting findings to SENSORS NA.
  - b. Suppliers will be released from Controlled Containment once the CPAR response has been approved.
7. J-STD solderability requirements or equivalent for electrical/mechanical components, wires and PCB/PWB assemblies.
  - a. All electronic components and wire subject to solder operations shall have solderability in accordance with J-STD-002 or equivalent.
  - b. All printed circuit boards and PCB/PWB assemblies shall have solderability in accordance with J-STD-003 or equivalent.
  - c. Suppliers shall provide a certificate with each lot submitted to CWCIS. The certificate shall be signed and shall specify the part number.
  - d. Suppliers shall notify the appropriate CWCIS buyer, in writing, where evidence or certification of solderability cannot be provided.
8. Serialized Items
  - a. The serial number(s) of items supplied on this procurement shall be on Seller's release documentation, (i.e. Certificate of Compliance, test reports, packing list, etc).
  - b. Serialization shall be maintained during processing (including traceability). Upon receipt of these items, Sensors NA shall assign a unique batch number to each individual serialized item.
9. Source Control Items where specified by drawing.
  - a. The items procured on this purchase order are Source Control items.
  - b. The following must be provided with each shipment:
    - i. Certification from the manufacturer that the items were actually produced by the designated manufacturer;
    - ii. Certification from the manufacturer that the items conform to the manufacturer' current standards of performance and quality'
    - iii. Certification stating that the distributor can furnish any traceability records or documentation required by the Purchase Order for lot control, testing, etc.
10. Visual Acceptance Criteria
  - a. QP-20020 incorporated by reference defines visual acceptance criteria for product quality.
11. Delivery Requirements
  - a. Suppliers are required to achieve 100% on time delivery. If a supplier will be unable to deliver product by the required due date, it is the suppliers responsibility to notify Sensors NA as soon as possible.

- b. On time delivery is defined as follows:
  - i. Long Island 4 days early and 3 days late
  - ii. Nogales 7 days early and 5 days late
  - iii. South Bend 4 days early and 3 days late
  - iv. Stratford 4 days early and 3 days late
  - v. Gilbert 4 days early and 3 days late
- c. Notification to Sensors must occur anytime suspect material has been shipped. Suppliers are to notify the SENSORS NA Purchasing or Supplier Quality department.
- d. Material or items that are believed to be suspect or nonconforming, or items being returned to SENSORS NA unprocessed, must be identified and packaged in such a way so as to prevent unintentional comingling with acceptable product.
  - i. Identification may include red tags, bag & tag, or other prominent marking.
  - ii. When possible, suspect, nonconforming, or unprocessed items should be packaged separately.

#### 12. Inspection Tools

- a. Curtiss-Wright recommends that suppliers implement the 10:1 rule with measurement and inspection tools. This rule of thumb is to multiply the given tolerance range by 10% (or divide by 10) to get the minimum resolution of the measuring device to be used.

#### 13. Contract Review

- a. The supplier shall review the requirements of a purchase order prior to committing to supply a product to Curtiss-Wright. This review shall ensure that:
  - i. Product requirements are adequately defined.
  - ii. Any special processes are identified.
  - iii. Potential risks have been identified.
- b. When purchase order requirements are changed, the supplier shall ensure that relevant personnel are made aware of the changed requirements.

## Product Specific Quality Clauses

Product Specific Quality Clauses are item number specific. These will only apply to an item number if listed on the purchase order line.

1. (Q1) Products containing material described in the Defense Federal Acquisition Regulations must be in compliance with DFAR clause 252.225-7009.
2. (Q2) Burr Requirements for machined parts only.
  - a. Any kind of burr, contamination or any other nonconformance can cause the transducer to malfunction and may cause serious catastrophic conditions. Therefore, if it is required by our drawing to:
    - i. "Remove burrs and break sharp edges". This shall be interpreted as no burrs are acceptable and the edges shall be broken to .005 -.010.
    - ii. "Maintain sharp corner". This shall be interpreted as no burrs are acceptable and corners shall not be marred or broken no more than .002 max.
    - iii. Sensors drawing notes take precedence over this requirement.
3. (Q3) All processes shall be Parker Approved.
  - a. If the supplier is not approved by Parker or if their approval is not in effect at this time, supplier shall not proceed with the order. Supplier shall contact the Buyer listed on the purchase order.
  - b. Parker's APSL is available at <http://www.parker.com/portal/site/PARKER/menuitem.f830ba32f37af5fe2c5c8810427ad1ca/?vgnextoid=7de94bad565e4310VgnVCM10000014a71dacRCRD&vgnnextfmt=default>
4. (Q4) All processes shall be Honeywell Approved.
  - a. If the supplier is not approved by Honeywell or if their approval is not in effect at this time, supplier shall not proceed with the order. Supplier shall contact the Buyer listed on the purchase order.
5. (Q5) All processes shall be Eaton Approved.
  - a. If the supplier is not approved by Eaton or if their approval is not in effect at this time, supplier shall not proceed with the order. Supplier shall contact the Buyer listed on the purchase order.
  - b. Eaton's APSL is available at: <http://www.eaton.com/Eaton/ProductsServices/Aerospace/index.htm>
6. (Q6) Removed.
7. (Q7) Drawing Interpretation
  - a. Unless otherwise stated by the drawing (Drawing notes take precedence) the following requirements must be maintained:
    - i. Remove burrs and break sharp edges" this shall be interpreted as no burrs are acceptable and the edges shall be broken .005" max.
    - ii. Maintain sharp corner" this shall be interpreted as absolutely no burrs are acceptable and corners shall be marred or broken no more than .002" max.
8. (Q8) Deburr Process
  - a. The seller shall deburr parts as per Sensors NA Deburring Procedure QUALITY STD#7.
9. (Q9) Flight Safety
  - a. Supplier to state on Certificate of Compliance and all manufacturing documentation
    - i. "FLIGHT SAFETY PART" and "HANDLE AND PACKAGE WITH CARE"
    - ii. \*\*\*FP\*\*\* SYMBOL DENOTES FLIGHT SAFETY CHARACTERISTIC FROZEN PROCESS.

- b. 100% inspection data is required with all shipments.
  - c. UTAS FPRB (Frozen Process Review Board) are required for all changes.
  - d. UTAS approval required prior to change.
10. (Q10) Honeywell Certificate of Conformance requirements
- a. Certification of conformance for special processes, shall be sent with any part or material that requires special processing such as plating, non-destructive testing (NDT), welding, anodize, heat treat, and chem. film. At a minimum, certificates shall:
    - b. Be signed by the certificated operator or designee and sent with each shipment.
    - c. List the part number and quantity.
    - d. List the process specification number and revision.
    - e. List CWCIS's purchase order number with any changes.
    - f. Reference the processors batch/work order number. Each multiple or split lot shall be identified.
    - g. As indicated on the purchase order or drawing, special processes shall be done by customer approved sources. The supplier shall show that they are on the customers approved process list at the time the work is performed. This can be done by sending a copy of the APL with their name and date on the list.
    - h. Heat treat process requires two separate tests for hardness be performed and certified by two different personnel on the certifications.
11. (Q11) All processes shall be Boeing Approved.
- a. If the supplier is not approved by Boeing or if their approval is not in effect at this time, supplier shall not proceed with the order. Supplier shall contact the Buyer listed on the purchase order.
  - b. Boeing's APSL is available at:  
<http://active.boeing.com/doingbiz/d14426/GetAllProcessors.cfm>
12. (Q12) Removed.
13. (Q13) Products must be in compliance with The Buy American Act 41 U.S.C. §§ 8301–8305.
14. (Q14) A Detail Inspection Plan (DIP) is required for all purchased parts and outside processed parts with the exception of Standard, Commercial and Catalog hardware identified is vendor items, or Industry / commercially available hardware AN, MS, AS. The DIP shall define the manufacturing operation at which the characteristic is inspected and the inspection method used, including the type of tooling / gauging instrumentation used. Characteristics that are subject to change after in-process acceptance (e.g., growth, shrinkage, and/or distortion) must be re-inspected prior to final acceptance. DIPs which contain characteristics which are "tool controlled" (castings, molded parts, etc.) may contain less than 100% of the drawing characteristics provided the following conditions are met: a) a number of characteristics shall be selected as "control" dimensions. Control dimensions shall be of quantity and type such that inspection of these characteristics will give the supplier enough information (based on tool construction, assembly, process variation, and drawing tolerance) to ensure that all other drawing characteristics are in conformance.



- 15.(Q15) UTAS Supplier Quality System Requirements ASQR-01 applies to this order. This requirement applies to the supplier and all sub-tier suppliers. Refer to the Normative Reference of ASQR-01 to ensure compliance to related documents. The latest revision of the document may be located at <http://www.utc.com/Suppliers/Pages/Aerospace-Supplier-Quality-Requirement-Documents.aspx>
- a. Includes supplier compliance to the requirements of AS/EN/JISQ9100 and ASQR-01 as defined in ASQR-01 (ASQR-01, 4.1.1).
  - b. Includes distributors shall be on the UTC Qualified Distributor List or certified to AS/EN/JISQ9100 or AS/EN/JISQ9120 (ASQR-01, 4.1.2).
  - c. Includes mitigation of counterfeit parts by complying to AS5553 for electronic components and AS6174 for non-electronic product (ASQR-01, 5.1.2).
  - d. Includes compliance to a documented Work Transfer process and ensure its application in its entire supply chain (ASQR-01, 4.2.3).
- 16.(Q16) UTAS Production Part Approval Process (UPPAP) ASQR-09.2 applies to this order. This requirement applies to the supplier and all sub-tier suppliers. The latest revision of the document may be located at <http://www.utc.com/Suppliers/Pages/Aerospace-Supplier-Quality-Requirement-Documents.aspx>
- 17.(Q17) Reference Latest Moog Moog SQR-1 for Moog Flowdown. Pull the latest copy from Moog's supplier portal at <https://www.moog.com/suppliers/information-for-suppliers-shipping-to-the-united-states/information-for-suppliers-shipping-to-the-united-states-aircraft-group.html>  
All processes shall be Moog Approved.
- a. If the supplier is not approved by Moog or if their approval is not in effect at this time, supplier shall not proceed with the order. Supplier shall contact the Buyer listed on the purchase order.
  - b. Moog's APSL is available at: <http://www.moog.com/suppliers/asps/>
- 18.(Q18) Honeywell Subcontracting Policy
- a. Honeywell suppliers shall ensure flow down to, and compliance with, all applicable Purchase Order and Engineering requirements to their sub-tier suppliers, including approved Special Process providers.
  - b. For Honeywell designed hardware, Supplier/subcontractor Purchase Orders to special processing providers must contain the following as a minimum:
    - i. Reference to the applicable Honeywell CAGE Code, or request for material.
    - ii. Applicable SPOC number(s).
    - iii. Honeywell part number and nomenclature of subject part.
    - iv. Special Processes to be performed and the applicable specification(s), revision letter(s) including the type, class, or methods and testing that are required by drawing or specification.
    - v. Any special drawing instructions/notes, as applicable; such as approved Materials Engineering Supplier Agreement, inspection class, inspection grade and inspection acceptance requirements, MOT's, MBP's, or special handling requirements not otherwise stated, etc.
    - vi. Fixed / Frozen process revision level and approval date. If not provided on the Honeywell purchase order, contact the Honeywell buyer for proper information to flow down.

19. (Q19) Supplier Sampling Requirements ASQR-20.1 applies to this order. This requirement applies to the supplier and all sub-tier suppliers. The latest revision of the document may be located at <http://www.utc.com/Suppliers/Pages/Aerospace-Supplier-Quality-Requirement-Documents.aspx>
20. (Q20) Pratt Whitney Supplier Quality Operating Procedure SQOP-01-01 applies to this order in addition to the ASQR-01 as stated in clause Q15. The SQOP-01-01 defines unique PWC requirements that are in addition to ASQR-01. Your Curtiss-Wright buyer may provide the latest revision of the SQOP-01-01 document.
21. (Q21) Moog Glass Beads - No glass bead processing is to be used on any Moog product. Different types of media blasting may be used, but no glass beads are allowed per Moog flowdown SQR-1. See Moog SQR-1 here: <https://www.moog.com/suppliers/information-for-suppliers-shipping-to-the-united-states/information-for-suppliers-shipping-to-the-united-states-aircraft-group.html>
22. (Q22) FAA Advisory Circular 21-55 applies to this order. Sensors NA must be informed if a supplier or sub-tier supplier is located outside the USA. If using a facility outside the USA, the FAA requires notification and approval prior to manufacturing. The supplier shall submit notification to Sensors NA in accordance with AC 21-55, Process to Support FAA Findings of Undue Burden or No Undue Burden for PAHs Requesting to Use a Manufacturing Facility Located Outside of the United States. The submittal form is located in AC 21-55, Appendix A, which is located at: [https://www.faa.gov/regulations\\_policies/advisory\\_circulars](https://www.faa.gov/regulations_policies/advisory_circulars)
23. (Q23) The latest revision of Honeywell 41-10748, Workmanship Manual Honeywell Engines, Systems & Services, Tempe applies to this order. This requirement applies to the supplier and all sub-tier suppliers. Your Curtiss-Wright buyer can provide the latest revision of the Honeywell 41-10748 document.