

Quality Clauses

REVISION HISTORY

Revision	Date	Author	Description
Rev A	09/16/2016	Craig Roberts	Initial release of document
Rev B	06/29/2017	Chris Young	No changes to Q-Clauses. Change affect Parent document only.
Rev C	04/13/2018	John Wineski	Updated 2.PQA.020-001 Q-Clauses: Added Q-7, Q-14 (a, b, c), Q-38a, and Q-44; updated Q-17, Q-20, Q-21, Q-24, Q-30, Q-37, and Q-41
Rev D	04/15/2018	Teresa Kassen	No changes to Q-Clauses. Change affect Parent document only.
Rev E	07/11/2018	Teresa Kassen	Added Q-6, Q-45 and Q-46
Rev F	08/23/2018	Teresa Kassen	No changes to Q-Clauses. Change affect Parent document only.
Rev G	02/21/2019	Teresa Kassen	No changes to Q-Clauses. Change affect Parent document only.
Rev H	05/21/2019	Teresa Kassen	Revised Q-37 to removed duplicative paragraph; revised Q-39
Rev J	6/30/2019	Teresa Kassen	Significant re-write and re-format of document. Renumbered Q-Clauses per map in document . Added the following Q-clauses: QA004 Sub-Tier Supplier Management; QS005 Paint Color Verification
Rev K	02/03/2020	Teresa Kassen	Modified instructions for QA section. QA003, eliminated requirements that were duplicated in other clauses. QS004A/B, added additional clarification. QS008A, removed authorization requirement. QS009B, added Certificate requirements. QS022, updated to reflect PWB packaging requirements.
Rev L		Teresa Kassen	No changes to Q-Clauses. Change affect Parent document only.

Revision	Date	Author	Description
Rev M	See System for date	Teresa Kassen	Added clarity to items 2 and of QA003, and paragraph 3 of QA006. Added last sentence paragraph 1, QS004A, Added new clause QS007B. Clarified requirement is paragraph1, QS008A. Added definition reference in QS009C background for material properties. Added Q-clause QS015D, Clarified language in QS022. Added definitions for Chemical, Mechanical and Physical properties. Removed allowance of spaces in markings noted in QS008B, QS008C, and QS020B

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1. INTRODUCTION

This document provides details of quality clauses (Q-Clauses) flowed down on a Purchase Order (PO). Clauses have been grouped for purposes of encouraging sellers to review all of the applicable requirements documents, including the Terms and Conditions, that accompany each PO. Each group has a heading that describes the overall purpose of the grouping. Most of the Q-Clauses now include background information.

NOTE: The background information is not intended to include requirements but to provide insight into the reason for the Q-clause.

For purposes of these Q-clauses, GA-ASI shall be referred to as “Buyer”. The term “seller” as used herein, shall mean supplier, seller, or other entities selling product or services to Buyer.

2. HELPFUL LINKS

2.1 GA-ASI SUPPLIER PORTAL/WEBSITE

This is a link to the GA-ASI Supplier Portal. <http://www.ga-asi.com/suppliers>. You can find a number of documents and email links.

2.2 INTERNATIONAL AEROSPACE QUALITY GROUP (IAQG)

This is a link to the IAQG website referenced later in this document. <http://www.iaqg.org>

2.3 TERMS AND CONDITION SITE

This link takes you to the GA-ASI Terms and Conditions Page. <http://www.ga-asi.com/terms-and-conditions>. Some of the Q-Clauses refer to the GA-ASI Terms and Conditions.

3. MAP OF NEW QUALITY CLAUSE NUMBERS TO PREVIOUS NUMBERS

New No.	Description	Old No.
QA001	Quality System	Q-15
QA002	Advanced Notification of Potential Product Issue	Q-6
QA003	Certificates of Conformance (COC)	Q-11
QA004	Seller Sub-Tier Supplier Management	New
QA005	Seller Corrective Action	Q-10
QA006	Nonconforming Material	Q-28
QS001	Government Inspection	Q-1
QS002A, QS002B	Quality System Certification to ISO 9001/AS9100	Q-13
QS003	Seller Engineering Change Notification	Q-46
QS004A	First Article Inspection (FAI)/Report (FAIR)	Q-17
QS004B	First Article Inspection Planning/Reporting for Critical Safety Items (CSI)	Q-37
QS005	Paint Color Verification	New
QS006	Critical Safety Item (CSI)	Q-39
QS007	Inspection - Source inspection	Q-18
QS007B	Inspections: Seller Inspection Pre-Secondary Operations	New
QS008A	Traceability requirements: Serialization Not Required	Q-24
QS008B	Traceability requirements: Serialization Required	Q-24a
QS008C	Traceability Requirements: Serialization for Systems and Kits	Q-42
QS009A	Certificate of Material(s): Retention	Q-12
QS009B, C, D	Certificate of Material(s): Submission	Q-33
QS010	Foreign Object Debris/Damage (FOD) Prevention	Q-43
QS011	UPA16400 Workmanship Requirements	Q-44
QS012A, B, C	Process Control Requirements-Level I;High, Level II; Medium, Level III; Low	Q-14 a, b, c, d
QS013	Calibration	Q-16
QS014	Electrostatic Sensitive Devices (ESD)	Q-25
QS015A	Special Processes: Sub-Tier Supplier Approval	Q-21
QS015B	Special Processes: Certifications - Submission	Q-21
QS015C	Anodized and Chemfilmed Aluminum Parts (Black Only)	Q-21
QS015D	Special Processes: Certifications - Retention	Q-21
QS016	Welding Process Requirements	Q-30
QS017	Micro Section Photo Requirement	Q-34
QS018A	Test Data: Collection and Submission	Q-23
QS018B	Test Data: Retention	Q-40
QS019	Data Storage Sanitization	Q-45
QS020A	Part Marking: Supplier Identification	Q-35
QS020B	Part Marking: Unique Identification (UID) and Grading Report	Q-38
QS020C	Part Marking: Unique Identification (UID and Verification Performed by Buyer	Q-38a
QS021	Rework Report	Q-36
QS022	Packaging, Handling, and Shipping	Q-26
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QT003	Counterfeit Goods, Detection and Avoidance	Q-41
QZ001	Barcoded Packaging Specification	Q-8
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4. QUALITY CLAUSES

QA - QUALITY CLAUSES THAT MAY APPLY TO ALL PRODUCTION ORDERS

Unless QZ002 is invoked, all of the following Q-Clauses, beginning with “QA” are applicable to all materials and can be applied to any product PO. These may also be applied in support of flight, flight test, or customer deliverables.

QA001. Quality System

BACKGROUND: An acceptable quality system is essential for doing business with Buyer. It provides the infrastructure and procedure for consistent, sustained, acceptable quality. Additionally, Buyer, either through self-direction or as required by its customer, needs the ability to review records, data, inspection methods and manufacturing processes as a result of issues or customer requirements to assure sustained quality of parts being provided. This clause includes a provision for ensuring access to review, audit, assess and verify, as necessary.

The Seller and Seller’s suppliers shall have and maintain a quality system(s) acceptable to the Buyer. The Buyer has the right to access and verify said system(s) through on-site audits and/or assessments.

QA002. Advance Notification of Potential Product Issue

*BACKGROUND: Issues, known by sellers but not effectively communicated to Buyer, cause non-conformances and customer dissatisfaction. Lack of information from sellers and sub-tier sellers related to upstream issues prevents expected product quality or reliability, on-time shipment of orders, and timely fulfillment of requirements. Buyer may request further action such as use of the Supplier Disposition Request (SDR) or other processes as a result of notifications. This is an **advanced** notification of **potential** issues.*

In the event the seller is, or becomes, aware of a potential product problem or issue that may have an adverse effect on the quality, reliability, or delivery of a product to Buyer, the seller shall immediately notify the Buyer Supplier Quality Engineering (SQE) Department at DL-AS-SQE-Group@ga-asi.com and the applicable Buyer procurement representative. This is an advance notification of potential issues. The following are examples of, but are not limited to, issues requiring notification: unplanned events, weather related events, major manufacturing issues, supply chain related events.

QA003. Certificates of Conformance (COC)

BACKGROUND: Certificates of conformance (COC) provide to Buyer an acknowledgement from seller that the seller has reviewed, understands, and meets all requirements of the PO. It means any questions about any requirements have been resolved. It assures Buyer that seller has procured, manufactured, processed and/or tested the purchased product as expected by Buyer in accordance with these Q-clauses and as otherwise agreed to in the PO.

The Seller shall furnish a COC with each lot/heat code/etc delivered certifying that each item of hardware and/or software conforms to all requirements of the Buyer's specification and PO and that all required test and inspections have been satisfactorily performed. At a minimum, COCs shall include:

1. Seller’s name
2. Buyer Part number and dash number as listed on the PO;
3. Seller Part number if listed on the PO
4. Manufacturer name and part number if listed on the PO

NOTE: Substitutions for parts listed on the PO are prohibited

5. Buyer Drawing revision level (when applicable)
6. Buyer Purchase Order (PO) number
7. Statement attesting that goods and services are of the quality specified and conform to the PO requirements, including specifications, drawings, specified raw and purchased materials, preservation, packaging, packing, marking requirements, physical item identification, and applicable Government and Buyer specifications, or equivalent wording.
Note: For Distributor items, the requirements are verification of OEM and OEM Part Number
8. If a Supplier Disposition Request (SDR) applies to a PO/Line Item, include applicable Buyer approved GS-type QN Number resulting from any SDR on the C of C. A copy of the GS QN may also be attached. It is prohibited to mix parts in a shipment covered under a SDR with parts not covered under the SDR.

It is preferred to have a printed name, date, signature or stamp, of the seller's authorized representative on the COC. Pre-printed or electronic signatures are acceptable.

QA004. Seller Sub-Tier Supplier Management

BACKGROUND: Sellers are required to manage their suppliers. This clause provides guidance and minimum requirements for assuring product requirements are appropriately flowed throughout the supply chain.

Seller shall have processes and procedures in place to manage their entire supplier base. The International Aerospace Quality Group (IAQG) Sub-Tier Assessment Matrix (www.iaqg.org/scmh) is acceptable guidance for sub-tier management processes and procedures.

Seller shall ensure that all Buyer requirements, applicable to the product procured, are fully contractually flowed down through all levels of seller's supply chain for product being delivered to Buyer. Sellers should maintain an Approved Supplier List and shall have controls in place to ensure work is not performed at unapproved or disapproved sources. Sub-tier suppliers should have an adequate quality management system, as determined by the seller's assessment. It is preferred that sub-tier suppliers are NADCAP, AS9100 or ISO9001 compliant or certified via a recognized third party Certification Body.

QA005. Seller Corrective Action

BACKGROUND: When either seller or Buyer identifies an issue, containment, investigation, or other similar requirement, seller shall promptly perform the required corrective action. This clause is needed to ensure that the seller has a system that works effectively, expeditiously and prevents current or future production or deliveries of product with non-conformances.

Seller shall maintain an efficient and effective corrective action system that prevents shipment of nonconforming products without prior written approval from Buyer. In response to a Buyer-initiated Corrective Action Preventive Action (CAPA) request, seller shall advise and deliver to Buyer in writing and in a timely manner the following:

1. Provide and fulfill containment plan within three (3) working days of receipt of the corrective action request.
2. Root Cause (RC) determination (along with method of determination), acceptable to Buyer, within thirty (30) calendar days of issuance of the corrective action request (or if

receipt of returned defective hardware is agreed to by SQE).

3. Written Corrective Action Plan (CAP), acceptable to Buyer, including actions to be taken, dates of implementation, and criteria for verifying effectivity. Additionally, similar products shall be evaluated for these corrective actions. Such CAPs shall include results of the evaluation. The CAP shall be submitted for written approval by Buyer SQE representative within ten (10) working days of delivery of the RC determination.
4. Verification of Effectiveness (VOE) Report. The VOE Report shall include the criteria for acceptance, the expected results, and the actual results observed. The VOE Report information shall be included in the CAPA response.

Buyer may issue an extension on an exception basis provided sufficient written justification is provided. Extensions may be granted for any corrective action phase provided the extension is requested prior to the due date of that phase.

Buyer reserves the right to perform source inspection and/or reviews until Buyer is satisfied that the accepted CAP has been effectively implemented.

QA006. Nonconforming Material

BACKGROUND: This clause conveys the expectation that the seller shall have a documented system and procedure for handling non-conforming product whether or not the seller is certified to a standard QMS (AS9100 or ISO9001). The system and procedure ensures that product with non-conformances does not get shipped to the Buyer through intermingling, lack of investigation, or lack of a disposition process that ensure approval for certain conditions.

Seller shall utilize a documented system and procedure for evaluation and disposition of non-conforming material to contain, track, analyze, determine root cause, and ensure effective preventative/corrective action implementation. Seller shall maintain a procedure to control the identification, documentation, evaluation, disposition, and segregation requirements of non-conforming products.

Seller's non-conformances that affect form, fit, function, reliability, maintainability, and safety shall not be given a disposition of "use as is" or "repair" through seller action without Buyer written approval. Rework to print will be acceptable. If seller determines a non-conformance or has reason to believe a non-conformance could potentially exist in previously delivered product, seller shall notify Buyer procurement representative within 48 hours of seller discovery. In addition, seller shall provide a written notification to Buyer including a description of the suspected nonconformance, potential safety risk or product impact, contract and/or PO number, Part Number, National Stock Number (NSN), and affected serial numbers, or lot numbers.

Seller shall notify Buyer of any non-conforming products Seller wishes to ship via the Supplier Disposition Request (SDR) process. Seller shall not ship parts until Buyer provides written authorization. Seller shall include the GS QN resulting from the SDR on the C of C when non-conforming part(s) are shipped. A Copy of the GS QN may also be attached. The affected parts shall be clearly identified with the GS QN number.

QS - QUALITY CLAUSES ASSIGNED BASED ON SPECIFIC PART REQUIREMENTS

Seller is responsible to comply with each "QS" Q-Clause assigned. These Q-Clauses are assigned to parts based on specific part requirements. Often, these requirements can be found on drawings, specifications or other requirements documents. However, Buyer reserves the right to impose these Q-Clauses as deemed necessary whether or not listed as a requirement in another document.

QS001. Government Inspection

BACKGROUND: This clause is usually imposed for Critical Safety Items (CSI). However, it is applied whenever Buyer's customer needs right of access for parts that require source inspection.

Customer inspection is required prior to shipment from seller's plant and/or seller's suppliers. At Buyer's discretion, inspections may include representatives from Buyer customers, Buyer, and/or the regulatory authority. Access shall be granted to all applicable areas of the facilities, at any level of the supply chain, involved in the PO and to all applicable records. Seller shall notify the Buyer five (5) working days prior to the time set for inspection and/or test of articles or materials. Buyer shall notify its customer.

QS002A. Quality System; Certification to ISO 9001

BACKGROUND: Commitment to certification shows a commitment to quality. The quality of every purchased part is important. Sellers may be asked to meet the requirement of ISO 9001 certification in order to provide product to Buyer.

Seller's Quality System shall conform to the requirements of ISO 9001. Third party registration by an accredited Registrar will be accepted as proof of compliance.

Obtaining and maintaining certification/registration by seller does not disallow Buyer to conduct audits, reviews, and inspections at the Seller's facility. Buyer reserves the right to conduct surveillance audits at seller's facility and assess seller's conformance to the ISO 9001 Quality Management System (QMS) requirements.

QS002B. Quality System; Certification to AS9100

BACKGROUND: Commitment to certification shows a commitment to quality. The quality of every purchased part is important. Sellers providing product that has a very high level of significance will be required to hold certification to AS9100.

Seller's Quality System shall conform to the requirements of AS9100. Third party registration by an accredited Registrar will be accepted as proof of compliance.

Obtaining and maintaining certification/registration by Seller does not disallow the Buyer to conduct audits, reviews, and inspections at the Seller's facility. Buyer reserves the right to conduct surveillance audits at seller's facility and assess seller's conformance to the AS9100 QMS requirements.

QS003. Seller Engineering Change Notification

BACKGROUND: When Buyer sources a product, it is tested to the configuration at the time of that purchase. The expectation is that configuration will not change. However, Buyer understands there are valid reasons to make updates and changes. It is imperative that Buyer be able to timely evaluate any such proposed updates and changes and assess the impact of those proposed updates and changes on Buyer products and to Buyer customers, and if necessary, make any changes/updates to Buyer product at integration and test.

Seller shall notify Buyer in writing of all proposed or actual Engineering Changes (including those generated by seller's sub tier suppliers that affect the Buyer purchased part).

Seller shall submit any requisite Change Notification via email to DL-AS-Supplier-Changes@ga.com a minimum of ninety (90) calendar days prior to the implementation of the change on the product sold to Buyer. Any requisite change to open POs cost and/or schedule

requires a Change Order from Buyer.

Changes that require written Change Notification include:

- Form- The end item's geometrically measured configuration, density, and weight or other parameters that uniquely characterize the item, component, or assembly. Form as applied to software changes denotes the language, language level and media.
- Fit- The ability of the delivered end item to physically interface or interconnect with or become an integral part of another item.
- Function- The action or actions, which an end item is designed to perform.
- Firmware- The combination of a hardware device and computer instruction or computer data that resides as read-only software on the hardware device. The software cannot be readily modified under program control.
- Functional Characteristics- Quantitative performance parameters and constraints including operational and logistic parameters and their respective tolerances. Functional characteristics include all performance parameters, such as range, speed, lethality, reliability, maintainability, and safety.
- Material- A generic term associated with systems, equipment, finishes, stores, supplies and spares, including related documentation, manuals, computer hardware and software.
- Functional Configuration Identifications-The initial approved technical documentation for a critical item defining:
 - All necessary functional characteristics,
 - Verification demonstrating achievement of specified functional characteristics,
 - Necessary interface characteristics and associated critical items,
 - Critical item functional characteristics and lower level critical items, if any, and
 - Design constraints such as envelope dimensions, component standardization, use of inventory items and integrated logistic support policies.
- Interchangeability- Any change impacting the delivered end items functional or physical equivalence, performance, reliability, and maintainability to the previously delivered end item for identical purposes.
- Interoperability- Any change to the component, assembly, or system which may prevent or impede the end item's ability to accept services to and from other systems or may impede or prevent the end item from operating with the other systems effectively and efficiently.
- Changes in Sub-tier Sellers- Any change/addition/deletion of a subordinate supply chain seller providing content to the purchased end item component or assembly delivered to Buyer.
- Changes in test/inspection methods- Any change in techniques used as a basis for product, component, or system acceptance.
- Changes in Bulk Materials- Any new source for raw materials with special characteristics from new or existing Suppliers. Any change in product appearance attributes where there is no appearance specification. Any changed parameters in the same process (e.g. outside Part Failure Modes and Effects Criticality Analysis (PFMECA) parameters of the approved product including packaging. Any change outside of the Design Failure Modes and Effects Criticality Analysis (DFMECA) (e.g. product composition, ingredient levels etc.) of the approved product.
- Any of the above noted changes originated by Seller's suppliers and sub-tier suppliers.

Seller shall include the following with any Change Notification.

1. Documentation updates that affect cost, warranty or contract milestones.
2. Affected part number(s) including Lot#(s), date code(s), or S/N(s) open POs,
3. Technical description of change, and technical impact
4. Reason/rationale for change
5. Financial impacts to Buyer (if any)
6. Details of potential impacts to both seller/ Buyer WIP, stores, and/or Buyer fielded products.
7. The revised specification/drawing

QS004A. First Article Inspection (FAI)/Report (FAIR)

BACKGROUND: First Article Inspection (FAI)/Reporting (FAIR) is a verification that all requirements are met and the results of the inspection are documented completely providing a detailed record. Because this is performed on one item, this is effective in confirming that a tool or process has the ability to make parts within specified requirements. However, FAI does not relieve seller from making subsequent parts to requirements. Therefore, seller should have an inspection plan in place to ensure all parts meet requirements and prevent escapes of non-conformances to Buyer. Because Buyer will validate some, or all, features on the same part Seller uses for FAI, tagging the part is essential. The FAIRs do not need to be submitted with each shipment once the FAIR is received and accepted by Buyer receiving inspection.

FAIRs shall be submitted in accordance with the latest version of the Aerospace Standard 9102. FAIRs shall be submitted on the first production lot, on the first order with this Q-clause invoked on the PO. The FAIR shall be documented on forms 1, 2 and 3. As specified in the Standard, Supplier forms are acceptable as long as they meet the intent of AS9102 (current version). After the FAIR has been accepted by the buyer on first production run with this q-clause invoked, full and partial (delta) FAIs and FAIRs shall be conducted and submitted for reasons as specified in the Standard. FAIRs shall consist of recorded actual drawing attributes, specification values (including tolerances), and/or requirements (dimensional, test data, processes, drawing notes, etc.). FAIs shall be provided against the drawing for the specific part number on the PO.

The first article item shall be clearly identified by a tag attached to the item or a label applied to the item's bag indicating the item was used to conduct/complete seller's FAI. A copy of the FAIR and any applicable certifications shall accompany the First Article part. The Buyer reserves the right to verify any or all of the characteristics documented on the FAIR at the seller's facility.

Requirements:

1. Follow AS9102 (latest version), using forms 1, 2, and 3, or equivalent
2. Clearly identify, with a unique tag, the part used to conduct the FAI
3. Submit FAIR with the first article part

It is preferred that a bubbled drawing be provided with the FAIR.

Once the first article and the FAIR is accepted by Buyer, seller shall not deviate from the process, change suppliers, or manufacturing facility locations without written authorization of the Buyer. Buyer reserves the right to request additional FAIRs due to special circumstances.

QS004B. First Article Inspection Planning/Reporting for Critical Safety Items (CSI)

BACKGROUND: This is similar to QS004A with some additional requirements driven by the customer. Due to the safety impact of these parts, control of materials and processes is essential. The required FAIRs do not need to be submitted with each shipment once the FAIR is received and accepted by Buyer receiving inspection.

Seller shall submit a First Article Inspection Plan (FAIP) to the Buyer within fourteen (14) calendar days of PO award. The FAIP shall list the intended methods used to verify compliance to the specific drawing dimensions, values and/or requirements. Once the FAIR has been delivered, and revisions that occur shall be delivered to Buyer five (5) working days prior to the start of the FAI.

FAIR shall be submitted in accordance with the latest version of the Aerospace Standard 9102. FAIRs shall be submitted on the first production lot, on the first order with this Q-clause invoked on the PO. The FAIR shall be documented on forms 1, 2 and 3. As specified in the Standard, Supplier forms are acceptable as long as they meet the intent of AS9102 (current version). After the first production run with this Q-clause invoked, full and partial (delta) FAIs and FAIRs shall be conducted and submitted for reasons as specified in the Standard. FAIRs shall consist of recorded actual drawing attributes, specification values (including tolerances), and/or requirements (dimensional, test data, processes, drawing notes, etc.).

The first article item shall be clearly identified by a tag attached to the item or a label applied to the bag indicating the item was used to conduct/complete the Seller's FAI. A copy of the FAI and any applicable certifications shall accompany the First Article item. The Buyer reserves the right to verify any or all of the characteristics documented on the FAI report at the Seller's facility.

Requirements:

1. Follow AS9102 (latest version), using forms 1, 2 and 3, or equivalent
2. Clearly identify, with a unique tag, the part used to conduct the FAI
3. Submit FAIR with the first article part

Once the first article and FAIR is accepted by Buyer, seller shall not deviate from the process, change suppliers, or manufacturing facility locations without written authorization of the Buyer. Buyer reserves the right to request additional FAIRs due to special circumstances.

QS005. Paint Color Verification

BACKGROUND: This clause is for the purchase of paint used at Buyer facility. It provides the method of confirmation of color and sheen (via the SAE standard) and stipulates coupons for verification at Buyer facility.

Each shipment of paint shall come from the same master batch. The seller shall submit two (2) coupons approximately 3" X 6" produced using standard paint application practices with the batch of paint provided in this shipment. In addition, seller shall provide the actual manufacturer's color reading report for each coupon. The color shall match the SAE-AMS-STD-595 color specified in the Purchase Order and as delineated in the applicable material specification using Precise Color Matching, Individual Color Chips. Coupons shall be packaged in light-fast envelopes, to preserve the chips from fading and damage in shipment. The Buyer will utilize provided coupons to validate compliance to the requirements.

If coupons and reports were previously provided with a shipment from the same master batch, it is not mandatory to supply new coupons and reports. In the event coupons are not provided for a subsequent shipment of the same master batch, the following shall be included on the

certificate of conformance:

1. A statement indicating chips were provided for this master batch with a previous shipment
2. Date of previous shipment that included the chips and reports for this master batch

QS006. Critical Safety Item (CSI)

BACKGROUND: This clause will apply to POs that include items that have been identified by the Buyer customer as Critical Safety Items(CSI). Buyer and/or the Buyer customer has imposed a number of requirements that must be met in order for seller to sell this product to Buyer and the Buyer Customer.

Seller shall complete and submit Part/Process Failure Modes and Effects Analysis (PFMEA) and CSI Control Plan to Buyer prior to initiation of manufacturing in accordance with GA-ASI ASI-04480, Critical Safety Item Supplier Plan. Submitted results of the PFMEA and CSI Control Plan will be reviewed by Buyer and approval will be granted in writing by the Buyer, CSI Control Board. Upon such written approval, the CSI Control Plan is considered frozen and seller shall not make any changes without prior written approval of the Buyer, CSI Control Board. Seller shall not ship parts without prior written CSI Control Plan approvals. So long as no changes are made to the CSI Control Plan, subsequent parts may be shipped under the approval of the frozen CSI Control Plan.

Seller shall flow this requirement down to seller's sub-tier supplier(s) for this order, based on risk identified in the approved PFMEA.

During performance of this program, the Buyer and Buyer's Customer reserve the right to perform on-site reviews of Sellers CSI Control Plan, Procedures and Records to verify continued adherence to the Critical Safety Item Supplier Plan and related drawing requirements by the seller and the seller's sub-tier supplier(s).

QS007. Inspections: Source Inspection

BACKGROUND: Source inspection is used to meet a contractual requirement with a customer of Buyer in order for Buyer to eliminate risk of receiving non-conforming parts or to verify features that cannot be verified at Buyer receiving inspection. To ensure a thorough and timely Source Inspection, all certification and test reports should be amassed and presented with the parts or promptly upon request.

Buyer shall have the right to conduct Source Inspection (SI) for this PO either on-site at seller's facility, and/or at seller sub-tier supplier's facility, or virtually by Buyer. If Buyer elects to perform virtual SIs, Seller shall promptly provide certifications, photos, test reports, etc. as reasonably requested by Buyer. Inspection/test and/or in-process inspection/test of the articles specified in this PO will be performed by Seller. Buyer's Quality Representative may elect to witness such inspections during their performance or to review inspection documents/records prepared by seller and made available at the agreed-upon time and at the agreed upon location of the Source Inspection. Prior to start of fabrication, seller and the Buyer shall determine the process steps at which SI shall be conducted. Seller shall notify the Buyer of the scheduled inspection/test date, five (5) working days (within the US) or fifteen (15) working days (outside the US), in advance. Product release after the completion of an acceptable SI shall be by Buyer stamp or signature by the Buyer's Quality Representative on seller's shipping or inspection documents.

QS007B. Inspections: Seller Inspection Pre-Secondary Operations

BACKGROUND: GA-ASI sources product that requires secondary processing by the seller. Once the product reaches the Seller final inspection and GA-ASI, some features are not measurable. The features are only measurable at the operation of manufacture and/or prior to the secondary operation. Therefore, the Seller is asked to provide evidence with each shipment that those features meet requirements. Examples of dimensions where the clause applies are

- *painted dimensions and features indicated on the drawing as "apply before paint" typically*
- *true positions of features prior to the installation of hardware such as PEM Nuts etc.*
- *dimensions obscured by subsequent welding or other assembly operations*

The seller shall submit a Dimensional Inspection Report (DIR) with each shipment of each production lot. Dimensions to be included in the DIR are those that require measurement prior to a secondary operation and cannot be validated at final inspection. Dimensions are to be recorded while work is in process. Purchase Order flowdown notes may further detail dimensional inspection requirements.

Unless directed by GA-ASI, the dimensional inspection report for these specific dimensions shall consist of:

- drawing requirements including notes, dimensional features, and sheet/zone locations
- the recorded actual results for each measurement as either individual measurements or a range where there are multiple instances of the same feature
- references to any applicable discrepancy reports
- evidence of acceptance
- part information including (at a minimum)
 - part number
 - description
 - batch / lot traceability
 - purchase order number

Suppliers may use their own inspection format to provide this information.

QS008A. Traceability Requirements: Serialization Not Required

BACKGROUND: Traceability enables faster investigation and containment should an issue arise. Any component or raw material can be the root of an issue. Maintaining traceability of unique lots of materials and subcomponents that go into a product is essential for containment activities. For clarity, duplication does not refer to pieces within a lot. Duplication refers to reuse of a lot/date/heat codes for completely different lots.

Unless otherwise specified on the PO, seller shall provide a means of traceability down to the purchased items/materials used to produce the PO. Seller may use the original manufacture Lot/Date/Heat Code or the Seller's method for identifying the end item product as required for proper traceability for non-serialized items. Seller shall package each Lot/Date Coded batch separately. Duplication of Lot/Date/Heat Code is prohibited.

Tape and reel products may contain a maximum of two Lot/Date Codes per reel without authorization. Both Lots/Date Codes shall be listed on the corresponding shipper and on the immediate packaging.

If the end item traceability includes serial numbers, or if the only method of traceability is serialization and neither QS008B or QS008C is identified as a requirement on the PO, Seller shall ensure all serial numbers for each part in this shipment are identified on the shipper.

QS008B. Traceability Requirements: Serialization Required

BACKGROUND: Traceability, especially serial numbers, provides Buyer and its Customers a means for tracking a number of Customer required metrics for the Buyer product. Additionally, serialization enables faster investigation and more detailed containment should an issue arise. Buyer scanning equipment drives the format requirements. Please note: Auto-correct has been known to replace a "hyphen" with an "end dash" which is a longer symbol and will cause a scan failure.

Seller shall identify each part with a unique serial number, the maximum number of alphanumeric serial number characters shall be "18", including all allowable symbols "-" (hyphen) and "/" (forward slash) (no other symbols, including spaces, allowed). Serialization of Alpha characters shall be capitalized A-Z. In the absence of a drawing identification requirement, part marking serialization shall be performed in accordance with standard industry practices.

Serialized shipments shall have serial number(s) listed on the corresponding shipper. Duplication of serial numbers is prohibited. Serial numbers shall be easily accessible for scanning and visual verification unless otherwise noted on the applicable drawing(s). The preferred method of serialization, where practical, is the use of bar codes applied directly to the part, using machine-readable marks either linear (no-UID) or 2D (UID) barcodes in accordance with the latest revision of MIL-STD-130.

QS008C. Traceability Requirements: Serialization for Systems and Kits

BACKGROUND: Traceability, especially serial numbers, provides Buyer and its Customers a means for tracking a number of customer required metrics for the Buyer product. Additionally, serialization enables faster investigation and more specific containment should an issue arise. Buyer scanning equipment drives the format requirements. Please note: Auto-correct has been known to replace a "hyphen" with an "end dash" which is a longer symbol and will cause a scan failure.

Seller shall identify each System or Kit (which include two or more boxes of serialized hardware) with one unique serial number, the maximum number of alphanumeric serial number characters shall be "18", including all allowable symbols "-" (hyphen) and "/" (forward slash) (no other symbols, including spaces, allowed). Serialization of Alpha characters shall be capitalized A-Z. Seller shall include a shipper that includes the top level part number & serial number, first level assembly part number(s) & serial number(s), and, if applicable, second level, major assembly part number(s) & serial number(s). The outside of the primary container in the group shall be identified with its part number & serial number, and the System part number & serial number. Duplication of serial numbers for a given part number is prohibited.

QS009A. Certification of Material(s): Retention

BACKGROUND: Material certifications are requested when material specifications are key to the product or are a Buyer Customer requirement. This Q-Clause is notification that a Material Certification is required but does not need to be submitted with the parts. The certification package is stored by Seller and made available upon request from Buyer. This applies to parts, components of sub-assemblies, and assemblies as defined on the Buyer drawings, BOMs, and specifications.

Buyer requirements documentation may specify materials/subcomponents. Seller shall collect and retain, certification records for specified materials and subcomponents used in the manufacturing of the purchased product. If any subcomponents or processes used in the manufacturing of this product are procured from seller sub-tier suppliers, a certification from the sub-tier suppliers is to be collected and retained with the seller's top level certification.

Certificates shall include:

1. For raw materials, material chemical and physical characteristics as noted on the Buyer drawing(s) and/or Bill of Materials (BOMs) with actual values recorded.
2. Process Specifications as noted on the Buyer drawing(s) and/or BOM(s)
3. Verification the specified material(s)/subcomponent(s) meet requirements (including both product number and source)

If Buyer requests the certification package, Seller shall provide the certification package within two (2) working days of the request.

QS009B. Certification of Material(s): Metallic Materials (except Titanium); Submission

BACKGROUND: Material certifications are requested when material specifications are key to the product. This Q-Clause is notification that delivery to Buyer of a Certification of Material is required to be submitted with the parts. The certification package will be submitted with each shipment and will also be retained by Seller. This applies to parts, components of sub-assemblies, and assemblies as defined on the Buyer drawings, BOMs, and applicable specifications used in the completion of the PO.

Buyer requirements documentation may specify raw materials. Seller shall collect, retain, and submit a copy of its certification records to Buyer for specified raw materials used in the manufacturing of the purchased product. If any subcomponents used in the manufacturing of this product are outsourced to Seller sub-tier suppliers, a certification from the sub-tier suppliers is to be collected, retained, and submitted with the seller's top level certification.

Certificates shall include:

1. For raw materials, material chemical and physical characteristics as noted on the Buyer drawing(s) and/or Bill of Materials (BOMs) with actual values recorded.
2. Process Specifications as noted on the Buyer drawing(s) and/or BOM(s)
3. Verification the specified material(s)/subcomponent(s) meet requirements (including both product number and source)

If the drawing does not define a specific raw material specification, contact Buyer procurement for direction.

If Buyer requests the certification package after delivery, Seller shall provide the certification package within two (2) working days of the request. Refer to Terms and Conditions for period required for record retention.

QS009C. Certification of Material(s): Titanium; Submission

BACKGROUND: Material certifications are requested when material specifications are key to the product. For titanium, the impact of the specification limits are even more significant. This Q-Clause is notification that deliver to Buyer of a Certification of Material is required to be submitted with the parts. The certification package will be submitted with each shipment and will also be retained by Seller. This applies to parts, components of sub-assemblies, and assemblies as defined on the Buyer drawings, BOMs, and applicable specifications used in the completion of the PO. For additional information, see [Definitions Section](#) for definitions of different property types.

Seller shall include with each shipment of end item product manufactured from Titanium material, an independent laboratory certified test report that states that the lot of material furnished has been tested, inspected, and found to be in compliance with the applicable

material specifications as defined on the Buyer drawing and/or BOM. The test report will list the specifications, including revision numbers or letters, to which the material has been tested and/or inspected and the material lot to which it applies. The test report shall include quantitative limits for chemical, mechanical, and physical properties, and contain the actual test and/or inspection values obtained.

If the drawing does not define a specific titanium specification, contact Buyer procurement for direction.

If a retained copy is requested, Seller shall provide the certification within two (2) business days of the request.

QS009D. Certification of Material(s): Non-Metallic Materials and Modified Subcomponents; Submission

BACKGROUND: Material and process certifications are requested when material specifications are key to the product. This Q-Clause is notification that delivery to Buyer of a Certification of Material is required to be submitted with the parts. The certification package will be submitted with each shipment and will also be retained by Seller. This applies to parts, components of sub-assemblies, and assemblies as defined on the Buyer drawings, BOMs, and applicable specifications used in the completion of this order.

For plastics, proprietary materials, and modified subcomponents, seller shall provide and retain a certification from the material manufacturer indicating that the material meets its specification. The certification shall be provided with each shipment. If a retained copy is requested, Seller shall provide the certification within two (2) business days of the request.

QS010. Foreign Object Debris/Damage (FOD) Prevention

BACKGROUND: Foreign object debris/damage (FOD) can negatively impact the function and performance of a product. Numerous examples can be found in any industry.

A FOD prevention program shall be maintained by seller. Seller's FOD prevention program shall include the review of design and manufacturing processes to identify and eliminate foreign object entrapment areas and paths through which foreign objects can migrate.

Seller's FOD prevention program shall include seller's periodic self-assessment of its internal FOD prevention practices, and where appropriate, an assessment of its sub-tier supplier(s) to measure effectiveness of program compliance requirements. Seller's FOD prevention program will provide initial and periodic FOD internal trainings, as deemed appropriate by Buyer.

QS011. UPA16400 Workmanship Requirements

BACKGROUND: Some part and assembly drawings are ambiguous. This clause applies to the titled workmanship requirements document to provide clarity. This clause is generally assigned to parts by program.

UPA16400 Workmanship Requirements apply to the PO. Seller is responsible to identify and conform to the applicable section(s) of Buyer drawing UPA16400 "Engineering Criteria, Workmanship & Drawing Clarification" on all end item deliverables at the latest revision in effect at the issue date of the PO.

Prior to performing any sections/paragraphs indicated as "Rework" or allowable material substitutions in UPA16400, Seller shall submit a SDR to Buyer. An approved GS-type QN resulting from the SDR will be the authorization from Buyer to proceed.

QS012A. Process Control Requirements: Level I; High

BACKGROUND: This clause is assigned to new or newer parts (exceptions by Buyer may apply) deemed by Buyer to be high in importance to functioning of the Buyer product or where an issue with the part presents higher risk.

Seller shall provide a detailed process description(s) and process control plan(s) for all processes utilized to manufacture this part/assy. The process description(s) will include operation definition, equipment used, work flow, applicable specifications/procedures/work instructions, process set-up sheets/raw material recipes, manufacturing location, and sub-tier seller identification. The process control plan(s) are to include part/process inspection criteria, verification methods, sampling plans, and reaction plans. Where applicable, Seller shall also define tooling used, special handling, and packaging requirements. Seller shall submit the process description(s) and control plan(s) to Buyer quality representative for written approval. At the time of submission, processes are considered frozen. Changes to the approved process(es)/plan(s) require Buyer quality representative written approval prior to implementation.

Key Deliverables/Requirements:

1. Detailed process description
2. Process Control Plan
3. Review and written approval by Buyer QA prior to implementation of process/plan changes

QS012B. Process Control Requirements: Level II; Medium

BACKGROUND: This clause applies to existing parts deemed by Buyer to have significant importance to the functioning of the Buyer product or where an issue with the part presents a concerning level of risk.

Seller shall notify Buyer of any change to the established process(es) used to manufacture this part/assy. Changes may include: operation definition, equipment used, work flow, applicable specifications/procedures/work instructions, process set-up sheets/raw material recipes, manufacturing location, sub-tier seller identification, control plans, and inspection plans. Where applicable, Seller shall notify Buyer of changes to Seller defined tooling used, special handling, and packaging requirements. Changes to the approved plan will require Buyer quality representative written approval prior to implementation.

Key Deliverables/ Requirements

1. Notification of changes to established manufacturing process(es)/plan(s)
2. Review and written approval by Buyer QA prior to implementation of process/plan changes

QS012C. Process Control Requirements: Level III; Low

BACKGROUND: This clause applies to parts deemed by Buyer to have importance to the functioning of the Buyer product or where an issue with the part presents risk.

Seller shall notify Buyer in writing and prior to making any change to the established processes to manufacture this part/assy. Changes may include: operation definition, equipment used, work flow, applicable specifications/procedures/work instructions, manufacturing location, sub-tier seller identification and inspection plans. Where applicable, seller shall also define tooling

used, time/temp criteria, special handling and packaging requirements. Changes to the approved plan will require written notification to Buyer prior to implementation.

Key Deliverables/Requirements

1. Notification of changes to established manufacturing process(es)/plan(s)
2. Written Notification delivered to Buyer thirty (30) days prior to implementation

QS013. Calibration

BACKGROUND: The purpose of this clause is to ensure Buyer purchased calibrated measuring equipment, calibration services, and items that are to be provided in a calibrated state, are built to, or calibrated in, a manner that meets certain standards.

Seller shall be ANSI/ISO/ASQ Q9001:2015 or AS9100 (Latest revision) compliant in all operations related to the performance of this task. Seller shall have written procedures that establish the bases of compliance with the standards of ANSI/ISO/ASQ 9001:2015, "Quality Management System- Requirements" or AS9100, "Quality Management System-Aerospace Requirements", and ISO 17025 accredited/certified to demonstrate technical competency and shall post and/or file copies of accreditations and/or certifications. Seller must maintain ANSI/NCSL Z540.1 and ISO 17025 accreditation status.

Seller shall submit for each calibrated item, one reproducible record of actual calibration results, including applicable graphic and tabular data. Records shall be traceable to the individual item tested, by part number, serial number and customer's order number for the item shipped. Seller's calibration certificate shall include a unique calibration tracking number, tolerance range, and when applicable, environmental conditions for each parameter calibrated. The certificate shall also state the operating error per specification, the degree of correction of out of tolerance condition and remaining uncorrected out of tolerance condition, if applicable.

QS014. Electrostatic Sensitive Devices (ESD)

BACKGROUND: This clause is applied to eliminate the risk of ESD on sensitive devices.

For Electrostatic Sensitive Devices delivered under the PO, Seller shall ensure that these devices are packaged and identified to provide adequate electrostatic protection in accordance with the Original Equipment/Component Manufacturers (OEM/OCM) Electrostatic Sensitive Devices material storage and handling protocols.

QS015A. Special Processes: Sub-Tier Supplier Approval

BACKGROUND: This clause applies when a known, or potentially problematic, process is required to complete the product being purchased. It helps to align processes and expectations. Buyer requires approval of sub-tier supplier(s) performing certain special processes in order to prevent nonconformances.

This PO requires at least one or more special process(es) which is/are identified on the drawing or applicable specification. Seller shall obtain Buyer SQE written approval of sub-tier supplier(s) performing special processes on this part. These processes include the following; anodizing (all types and colors), passivation, non-destructive testing, heat treating, plating, brazing, soldering, powder coating, painting, etc.

QS015B. Special Processes: Certifications – Submission

BACKGROUND: Material and process certifications are requested when material specifications are key to the product. This Q-Clause is notification to Seller that a Certification of Material is required to be submitted to Buyer with the parts. The Certification of Materials package will be submitted to Buyer with each shipment and a copy will also be retained by Seller and made available to Buyer upon request. This applies to parts, components of sub-assemblies, and assemblies as defined on the Buyer drawings, BOMs, and applicable specifications used in the completion of the PO.

This PO contains a part that has at least one or more special process(es) which is/are identified on the drawing or applicable specification. Special processes include but are not limited to, anodizing (all types and colors), passivation, heat treating, plating, brazing, soldering, powder coating, painting, Non-Destructive Testing, etc. Seller and Seller's sub-tier sellers shall submit a Certification of Material listing the following related to the special process(es):

1. Seller and/or its sub-tier seller name details
2. PO number under which the parts were processed
3. Part Number and Revision
4. Special process performed
5. Specification or Standard for each special process(es) performed

NOTE: Verification testing results noted in the specification shall be retained and made available to Buyer within three (3) working days of Buyer's request or with shipment, if indicated on Purchase Requisitions and POs.

QS015C. Anodized and Chemfilmed Aluminum Parts (Black ONLY)

BACKGROUND: This clause is intended to clarify specific requirements for Black Anodize and Chemfilmed parts.

Seller shall perform all requirements in Table 1 for Black Anodized and Chemfilmed aluminum parts. These requirements are in addition to those listed in QS015B whether or not QS015B was flowed individually.

Table 1. Requirements for Black Anodized/ Chemfilmed Aluminum Parts

<u>Special Process</u>	<u>Requirement</u>	<u>Test Reference</u>	<u>Additional Criteria</u>	<u>Testing Frequency</u>	<u>Submit or Retain test results</u>	<u>Comments</u>
Aluminum Parts Anodized	Light Fastness Resistance	MIL-A-8625 Type II and III, Class (Dyed); Paragraphs 3.7.1.3 and 4.5.4	≤ Delta E (unless otherwise specified in the contract or purchase order.)	Annually and after change to dye product or supplier	Results from third party test labs shall be submitted with each shipment	Samples for light fastness testing shall come from the same batch that is prepared for monthly corrosion resistance testing.
	Workmanship	MIL-A-8625 Type II and III, Class (Dyed); Paragraphs 3.13	Meets	Per unit	N/A	N/A
Aluminum Parts PTFE Anodized	Corrosion Resistance	MIL-A-63576 Type I or SAE AMS2482 Type I	N/A	Monthly minimum	Retain	N/A
	Coating Thickness		N/A	Each lot	Retain	N/A
	Workmanship		Meets	Per unit	N/A	N/A
Aluminum Parts Chemfilm	Corrosion Resistance for Class 1A and 3	MIL-DTL-5541 Type I and II; paragraphs 3.6.1, 4.2 and 4.4.1	N/A	Monthly minimum	Retain	N/A
	Wet Tape/Paint Adhesion for Class IA and 3	MIL-DTL-5541 Type I and II; paragraphs 3.6.2, 4.2 and 4.4.2	N/A	Monthly minimum	Retain	N/A
	Electrical Contact Resistance for Class 3	MIL-DTL-5541 Type I and II; paragraphs 3.7, and 4.2	Use resistance values found in paragraph 6.1.2.1	Monthly minimum	Retain	Use resistance values found in paragraphs 6.1.2.1
	Workmanship/ Appearance	MIL-DTL-5541 Type I and II; paragraph 3.5	Meets	Per unit	N/A	N/A

QS015D. Special Processes: Certifications – Retention

BACKGROUND: Material and process certifications are requested when material specifications are key to the product. This Q-Clause is notification to Seller that a Certification of Material is required to be submitted to Buyer with the parts. The Certification of Materials package will be submitted to Buyer with each shipment and a copy will also be retained by Seller and made available to Buyer upon request. This applies to parts, components of sub-assemblies, and assemblies as defined on the Buyer drawings, BOMs, and applicable specifications used in the completion of the PO.

This PO contains a part that has at least one or more special process(es) which is/are identified on the drawing or applicable specification. Special processes include but are not limited to, anodizing (all types and colors), passivation, heat treating, plating, brazing, soldering, powder coating, painting, Non-Destructive Testing, etc. Seller and Seller's sub-tier sellers shall retain a Certification of Material listing the following related to the special process(es):

6. Seller and/or its sub-tier seller name details
7. PO number under which the parts were processed
8. Part Number and Revision
9. Special process performed
10. Specification or Standard for each special process(es) performed

Certification of Material shall be made available to Buyer within three (3) working days of Buyer's request.

QS016. Welding Process Requirements

BACKGROUND: Because of the significance of welding to the aerospace industry, Buyer is taking additional steps to assure welding Sellers meet necessary requirements to weld and test for Buyer. Welding Sellers who do not obtain the required Buyer approval will not be able to supply Buyer with welded product.

Seller shall conform to the fusion weld and non-destructive examination requirements set forth in the current revision of ANSI/AWS D17.1, Specification for Fusion Welding for Aerospace Applications. Seller shall submit a documented Weld Procedure Specification (WPS) and supporting Procedure Qualification Record (PQR) for Class "A" and "B" type welds to the Buyer procurement representative for written approval by Buyer Engineering Authority. Seller shall submit full document package as defined in Table 2.

Seller and its sub-tier supplier(s) shall permit Buyer to perform surveys/audits to verify compliance with the welding and qualification requirements. If Seller uses sub-tier suppliers to perform welding or test services, the requirements specified in the Buyer drawing/specifications, PO, other requirements documents, and this Q-Clause (QS016) shall be flowed down to its sub-tier supplier(s) and the Seller shall ensure full compliance with these requirements by its sub-tier supplier(s).

Any in-process weld rework/correction performed on GA-ASI material shall be documented by the supplier's non-conforming material process. The maximum allowable weld rework attempts to an individual flay/indication/location is two (2).

Table 2. Requirements for Welding Processes on Buyer Product

Welding Process Specification	Requirement & Test Reference	Approvals	Document Packages Required for Approval/Acceptance
AWS D17.1, Specification for Fusion Welding for Aerospace Applications; CLASS A CLASS B	Fusion Weld Pre and Post Qualification Process Per section 7.	<p>Submit to: Buyer Authorized Procurement Representative</p> <p><u>Approval Granted by:</u> The Buyer Weld SME, Level III NDI, SQE, and Engineering Weld Authority</p> <p><u>Approval Notification:</u> Provided to Seller via a signed Approval Letter.</p>	<p><u>Initial Qualification Submittal & Changes to WPS:</u></p> <ul style="list-style-type: none"> ▫ Weld Map or Diagram (as applicable per supplier process) ▫ Controlled Documented WPS & Controlled Documented PQR with essential variable per AWS D17.1 ▫ 3rd Party Certifications ▫ 3rd Party Nondestructive/metallographic examination results <p><u>With Each Lot:</u></p> <ul style="list-style-type: none"> ▫ As required per AWS D17.1
AWS D17.1, Specification for Fusion Welding for Aerospace Applications; CLASS C	Per section 7.	Visual Inspection by Supplier CWI (approval granted through Buyer Weld Authority)	<p><u>Initial Submittal:</u></p> <p>Certification of Inspection by CWI (typically a CWI stamp)</p> <p>WPS if requested by Buyer</p>

QS017. Micro Section Photo Requirement

BACKGROUND: This is a standard requirement for materials to which this clause is assigned. Materials include PWBs and other parts for which micro sectioning is a suitable method of verification.

Seller shall submit with the PO, photographs of the micro sectioned test specimens that clearly depict conformance to etch back and smear removal requirements per the identified application requirements on the engineering drawing.

QS018A. Test Data: Collection and Submission

BACKGROUND: This clause enables Buyer to verify product test results when determined significant or necessary to do so by Buyer.

Seller shall submit results of product testing in a form of documented data. This data shall include actual data attained and required specification values/requirements and overall pass/fail results.

QS018B. Test Data: Retention

BACKGROUND: Buyer does not require delivery of test data with its purchased products unless delivery is specified or Buyer later determines that such delivery is required. Sometimes data is required to support investigations, etc. In those cases, Seller shall provide the test data for their product to Buyer promptly upon Buyer's request.

Seller shall retain results of product testing in a form of documented data. This data shall include actual data attained and required specification values/requirements. Seller shall provide the results to Buyer within three (3) working days of request from Buyer.

QS019. Data Storage and Sanitization

BACKGROUND: Buyer has a vested interest in knowing which memory within a product that it uses and/or incorporates into its products is volatile and non-volatile. This information enables Buyer to create procedures that will address how to prevent information that is proprietary or sensitive in other ways (e.g. classified) from being accessed by unauthorized individuals.

Seller shall provide a Certificate of Volatility (COV) that will delineate all volatile memory, nonvolatile memory and media storage capabilities with its product. Buyer will provide Seller with a COV template.

QS020A. Part Marking: Supplier Identification

BACKGROUND: This is a requirement for federal acquisitions.

Seller shall mark parts with their cage code (preferable) or assigned (Six digit) vendor code near the part number and revision in accordance with the identification and application requirements on the engineering drawing.

QS020B. Part Marking: Unique Identification (UID) and Grading Report

BACKGROUND: This clause is driven by Customer requirements and applicable federal regulations, including the Federal Acquisition Regulations (FARs) and/or Defense Federal Acquisition Regulation Supplement (DFARS). Reports are used to ensure Unique Identification (UID) printing has not degraded and that the Customer will be able to read the label upon receipt.

Seller shall produce and verify UID markings in accordance with the latest revision of MIL-STD-130. Seller shall submit with each shipment Quality (symbol verification) reports IAW MIL-STD-130, 5.2.7 MRI marking quality. The first and last UID markings of the lot shall be part of the samples that are verified. Human Readable Information (except direct part markings) shall be legible and accurate. UID markings shall be affixed to be easily accessible for scanning and visual verification unless otherwise noted on the applicable drawing(s). The maximum number of alphanumeric serial number characters shall be "18", including all allowable symbols "-" (hyphen) and "/" (forward slash) (no other symbols, including spaces, allowed). Serialization of Alpha characters shall be capitalized A-Z.

QS020C. Part Marking: Unique Identification (UID) and Verification Performed by Buyer

BACKGROUND: This clause is driven by customer requirements and applicable federal regulations, including the FARs and/or Defense Federal Acquisition Regulations Supplement (DFARS). This clause is assigned when the marking is required but when Seller is unable to comply with the requirement. It is used as a notice that UID marking is required and that because Seller is unable to comply with the requirements, Buyer will apply the UID marking.

Seller acknowledges and agrees that UID marking in accordance with latest revision of MIL-STD-130 will be created and applied to Seller parts by Buyer personnel upon receipt by Buyer. This will include the issuance and marking of Serial Numbers if the parts are not serialized by Seller. Buyer's application of the UID and serial numbers shall not impact the warranty. Seller shall provide necessary guidance for application.

QS021. Rework Report

BACKGROUND: Rework reports are used as part of the product log for the Buyer top level assembly.

In the event the item is returned with a reported defect and the seller determines the item is reworkable, Seller shall test, evaluate and rework as required. Seller shall provide a complete detailed rework report including test results, evaluation findings and description of all work performed.

Items may be returned as functional failures. In the event that the item is found to be fully functional and the failure/discrepancy could not be duplicated, Seller shall state the Can Not Duplicate (CND) condition on the test and evaluation report.

In the event that the item is replaced with a new item rather than being reworked and seller will not be submitting a rework report, seller shall provide a statement on the COC or pack slip indicating that the item was replaced.

QS022. Packaging, Handling, and Shipping

BACKGROUND: This clause is intended to ensure parts arrive in conforming condition. It also ensures packaging and storage does not induce a non-conformance. This clause applies when normal shipping and storage introduce a risk of non-conformance, or when parts must be stocked individually at Buyer, as determined by Buyer or its customer. This includes, but is not limited to, Titanium, plastic materials such as Torlon and Nylon, and other environmentally sensitive or shipping sensitive parts and assemblies.

Seller shall clean, preserve and use special packaging as required on the PO.

If not specified, seller may use specially designed shipping containers and/or good commercial practices as deemed necessary to prevent shipping damage. Parts are to be individually labeled. At a minimum, the label shall include the following information: Part number and part revision status. Packaging requirements contained on the Engineering drawing take precedence.

If order is for Printed Wiring Boards (PWB), package as follows per the type of finish, either 1. or 2. below:

1. HASL Finish: Each PWB shall be sealed individually using a moisture barrier bag, desiccant material and humidity indicator card. Reference IPC-1601.
2. Silver/Gold Finish: Each PWB shall be sealed individually using a moisture barrier bag and humidity indicator card. Reference IPC-1601. Desiccant material should not be utilized.

QS023. Specialized Tooling

BACKGROUND: See clause below.

Specialized Buyer tooling is required to perform the PO. Contact Buyer procurement representative.

QS024. Age Sensitive Materials

BACKGROUND: This clause is necessary when Buyer must provide the material subject to a limited shelf-life or aging to the customer. It is necessary to ensure the product is usable when received by the customer.

Seller shall submit with each shipment for materials subject to aging, shelf life information including manufacturer's lot or batch number and/or date code, and expiration date. A minimum of 80% shelf life must remain at time of receipt.

Note: For date codes expressed as a quarter and year as the date of manufacture (i.e. Q1, 2008), Buyer will use the first month and day of the specified quarter to receive materials and calculate the remaining shelf life.

QS025. Explosives

BACKGROUND: This clause is driven by Department of Transportation (DOT) safety and regulations for explosives.

The PO contains materials requiring Department of Transportation (DOT) classification. Seller shall tag each deliverable unit prior to packaging for shipment to indicate "EXPLOSIVE" DOT classification, type and net weight. Additionally, all intermediate and outer containers shall indicate the DOT shipping name, hazardous classification and storage compatibility group. The word "EXPLOSIVE" shall be clearly stenciled and visible on all sides of the package. Seller shall submit Bureau of Explosive documentation as to material classification, material description, explosive classification, and shipping information. Shipping information necessary to properly package, mark and label, in accordance with Department of Transportation Hazardous Materials Regulations shall be included. POs are subject to Buyer inspection at destination and will not be accepted by Buyer if Seller fails to comply with the requirements specified above.

QS026. Service Bulletin, Field Bulletin, Airworthiness Directives

BACKGROUND: This clause is applied to address Civil Aviation Authority requirements imposed on Buyer to reduce risk of airworthiness, reliability/maintainability, and safety issues.. It is primarily directed at OEM products provided from both the OEM directly, as well as, distributors of OEM products. Notifications may be passed along to Buyer Customers .

Seller shall provide written notification of any OEM or Civil Aviation Authority recommended modifications to hardware or maintenance procedures that affect airworthiness, reliability/maintainability or safety. Notifications shall be provided to Buyer by email to SM-Vendor-Bulletin-Submission@ga.com. Seller format of notifications may be used. Any publication of an applicable Airworthiness Directive (AD), Service Bulletin (SB), Field Bulletin (FB) or other equivalent documentation shall be included with the notification. Seller shall note actions required to comply with their notification.

QS027. GIDEP Alerts

BACKGROUND: GIDEP Alerts are essential across manufacturing to ensure products function as intended. This sharing of information prevents observed product anomalies and issues that result in increased cost for both suppliers and customers.

Seller shall subscribe to the Government Industry Data Exchange Program (GIDEP). Seller shall immediately document and provide formal written notification(s) related to any observed discrepancies impacting products directly manufactured by, or procured from, the OEM and

distributed to Buyer. Notifications shall be emailed to Zz_AS_EE_Component@ga.com. If the notice is intended to provide hardware obsolescence or end of life notification, Seller is requested to provide this notification as soon as-possible prior to hardware end of life.

QS028. Seller/Distributor

BACKGROUND: This clause will only be applied to parts provided by distributors. It is intended to ensure OEMs are correct for the part being procured.

This PO includes parts, components, and/or materials, provided by seller, that are not manufactured by the seller. Required manufacturers are listed on the PO, design drawing, design specification, and/or other requirements documents provided to seller. Seller shall confirm the purchase of these parts, components, and/or material from the specified/required manufacturers by listing them on the COC and packing slip.

Substitutions for manufacturers or part numbers not specified on the PO are prohibited.

QT - QUALITY CLAUSE REQUIREMENTS FLOWED IN PO TERMS AND CONDITIONS

Q-Clauses that begin with "QT" are found in the Terms and Conditions that accompany each PO. Please refer to the PO Terms and Conditions to ensure full compliance to each of the requirements in this section.

QT001. Notification of Facility /Ownership/Quality Manager/Quality System Change

The requirements for this Q-Clause are found in the Terms and Conditions provided with the PO. Refer to the Terms and Conditions sections titled "ASSIGNMENTS, CHANGES TO NAME OR PLACE OF MANUFACTURE" and "QUALITY CONTROL".

QT002. Buyer Review

The requirements for this Q-Clause are found in the Terms and Conditions provided with the PO. Refer to the Terms and Conditions section titled "QUALITY CONTROL".

QT003. Counterfeit Goods Detection and Avoidance

The requirements for this Q-Clause are found in the Terms and Conditions provided with the order. Refer to the Terms and Conditions section titled "COUNTERFEIT GOODS".

In addition to the Terms and Conditions clause for Counterfeit Goods, for electronic parts that are not in production or that are currently unavailable in stock, Seller shall only purchase from Contractor-Approved Suppliers (see definitions below) who have appropriate policies and procedures in place to detect and avoid counterfeit electronic parts and suspect counterfeit electronic parts.

QZ - OTHER CLAUSES**QZ001. Barcoded Packaging Specification**

BACKGROUND: This clause is intended to increase throughput and reduce errors at Buyer Receiving. This positively affects sellers as hold-ups are reduced and invoices get processed more efficiently as a result.

The seller shall provide barcoded product identification and associated documentation, in compliance with ASI-12014, for all physical deliverables. The total number of labels is based on the number of PO line items, number of serialized parts, and the number of packages for the specific PO line item. The labels shall be interpretable/readable by a barcode scanner and placed

in a manner to prevent folds, creases, or damage.

QZ002. Quality Clauses Are Not Required

There are no quality clauses required for this part except when Barcoding per QZ001 is required.

5. ACRONYMS

The following is an alphabetical listing of acronyms used in this document.

AD	Airworthiness Directive
BOM	Bill of Materials
CAPA	Corrective Action Preventive Action
CND	Can Not Duplicate
COC	Certification of Conformance
COV	Certificate of Volatility
CSI	Critical Safety Item
CWI	Certified Weld Inspector
DFARS	Defense Federal Acquisition Regulation Supplement
DFMECA	Design Failure Modes and Effects Criticality Analysis
DOT	Department of Transportation
ESD	Electrostatic Sensitive Devices
FAI	First Article Inspection
FAIP	First Article Inspection Plan
FAIR	First Article Inspection Report
FAR	Federal Acquisition Regulation
FB	Field Bulletin
FOD	Foreign Object Debris/Damage
GIDEP	Government Industry Data Exchange Program
NSN	National Stock Number
OCM	Original Component Manufacturer
OEM	Original Equipment Manufacturer
PFMEA	Part/Process Failure Modes and Effects Analysis
PFMECA	Part Failure Modes and Effects Criticality Analysis
PQR	Procedure Qualification Record
PWB	Printed Wiring Board
Q-Clause	Quality Clause
QMS	Quality Management System
RC	Root Cause
SB	Service Bulletin
SDR	Supplier Disposition Request
SI	Source Inspection
SQE	Supplier Quality Engineer
UID	Unique Identification
VOE	Verification of Effectiveness
WPS	Weld Procedure Specification

6. DEFINITIONS

The following is an alphabetical listing of definitions for terms used in this document.

Chemical Properties	A property that can only be determined by changing the chemical make-up of the material.
Control Plan	A plan that identifies characteristics used to confirm the result of the manufacturing process to requirements. The control plan includes characteristic or requirement details, tolerances, assessment/measurement methods, etc.
Partial (Delta) FAI	A first article inspection of only characteristics that have changed since the most recent FAI. Characteristics may have changed due to design changes, configuration changes, process changes or other changes.
Precise Color Matching, Individual Color Chips	Method of color matching described within the SAE-AMS-STD-595 standard.
Major Manufacturing Issues	Issues affecting manufacturing that can impact delivery of product to agreed upon schedules. Examples include, but are not limited to, a breakdown of non-redundant machinery or Union strike/walkouts.
Mechanical Property	Properties a material exhibits upon application of forces.
Non-Volatile Memory	Non-volatile memory is computer storage that does not lose content when power is lost.
Physical Properties	Properties that are measureable such as density, coefficient of expansion, melting point, etc.
Verification of Effective	A means for assessing if results are as expected and are consistent. Verification of effectiveness requires documented criteria and a report documenting results that meet the criteria.
Volatile Memory	Volatile memory is computer storage that only maintains its data while the device is powered.