

LSI Supplier Quality Clauses

MANUFACTURING AND PRODUCTION

P-21-002

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1.0 INTRODUCTION

LSI is committed to providing the highest quality products that meet or exceed customer expectations, and to provide cost effective, technically sound training solutions to our customers. In doing so, managing quality control during manufacturing and final product must be accomplished during all phases and must comply with design standards.

2.0 PURPOSE

The purpose of this document is to flow-down to our supply base the guidelines that have been established for Purchasing, Shipping and Quality for Purchase Orders issued to all Suppliers. All Suppliers shall comply with all Purchase Order Quality Clause requirements and flow-down any applicable requirements to their Sub-Tier/Subcontractors and Sub-Tier/Subcontractors are to flow down these requirements as required.

3.0 SCOPE

This document will apply to all Suppliers and their Sub-Tier/Subcontractors and is used to identify common quality clauses that LSI can apply to Purchase Orders (POs).

4.0 QUALITY CLAUSES

The any of the following Quality Clauses may be applied to purchase orders from LSI. All Quality C lauses, if applicable, will be indicated on the Request for Quote (RFQ) and any resulting Purchase Order (PO).

4.1 SQC 100 CERTIFICATE OF COMPLIANCE / CONFORMANCE (CoC)

The Supplier shall include a Certificate of Conformance (CoC) with each shipment for Goods identified on shipping document and any Special Processes completed by Seller. If Seller is not manufacturer (or service provider), a manufacturer's (or service provider's) CoC shall also be included in addition to the Seller's CoC. All CoCs shall contain the following information, when applicable, and shall be validated by an authorized Supplier's representative, by either an inspection stamp or a signature:

- Supplier's name and address
- LSI PO number / contract number
- LSI part number and revision
- Customer supplied part number and revision (As Required)
- Traceability information representative of each item - to include the lot trace (e.g., material analysis, date, batch, heat) or the individual item trace (e.g., serial number)
- Material and/or process specifications (As Required)
- Actual measurements or reference to test inspection and test data documentation as applicable
- Statement of Conformance by the Supplier declaring the product or service has met the requirements of the purchase order including drawings and specifications at the prescribed revision level
- Signature, Title and Date by an authorized representative of the issuing organization

4.2 SQC 101: SHIPPING DELAY

Any delay in shipment for any reason must be conveyed to LSI purchasing agent as soon as the delay is known by the supplier.

- COST OF DELAY, supplies identified for late delivery are subject to equitable price reduction determined by LSI. Failure to agree to a price reduction shall be a dispute.

4.3 SQC 102: PACKAGING

Unless otherwise specified in the Purchase Order, the Supplier shall package all material in a manner that will ensure protection against corrosion, oxidation, deterioration and physical damage during shipment to LSI. The Supplier shall comply with any special packaging and labeling requirements requested by LSI or by its customer.

Electrostatic sensitive product (ESD) shall be handled, packaged, identified and shipped in accordance with ANSI/ESD S20.20 requirements.

Hazard Warning Labels from the manufacturer, importer, distributor or Supplier shall be affixed to each individual container of toxic substances or hazardous chemical delivered to LSI and shall include hazard warnings as defined by OSHA Hazard Communications Standard 29 CFR 1910-1200.:

- Supplier's name and address
- Purchased Part Number
- Revision Level
- Manufacturer's part number (if different from the purchased part number)
- Purchase Order Number
- Date
- Quantity
- Serial Number (As Required)
- Lot Number (As Required)
- Country of Origin

Note: Do not combine items from different purchase orders in the same shipping container or on the same packing slip.

All items received at LSI must have shipping documentation or may be refused and returned to the Supplier at the Supplier's expense.

4.4 SQC 103: SUPPLIER SUB-TIER CONTROL

Supplier is responsible for the quality of all sub-tier products. The Supplier shall flow-down all applicable purchase order requirements to Sub-Tier/subcontractors and their Sub-Tier/subcontractors to the lowest level.

4.5 SQC 104: FOREIGN OBJECT DAMAGE (FOD) PREVENTION

The Supplier shall maintain a FOD program/process that is in compliance with AS/EN/SJAC 9146 FOD Prevention Program-Requirements for Aviation, Space, and Defense Organizations. The Supplier shall ensure

work is accomplished in a manner preventing foreign object debris and damage to deliverable items. The Supplier shall maintain good work area housekeeping practices, parts protection, hardware and tool accountability and parts and material storage and handling in a manner adequate enough to preclude the risk of FOD incidents .

Supplier shall inspect all objects/materials and any inaccessible or obscured areas and compartments during assembly for foreign prior to closing.

4.6 SQC 105: AGE-CONTROLLED / SHELF LIFE ITEMS

For Age-Controlled item(s) Seller shall include on shipping documentation (or labeling) the following:

- Date of the manufacture or cure date
- Shelf life (period of time material maintains characteristics if stored properly)
- Storage temperature
- Respective control identifier for each lot, batch, heat, heat treat, billet and/or unit identification number

The item(s) shipped under this contract must arrive at Buyer's facility with at least 80% of the Manufacturer's shelf life remaining.

4.7 SQC 106: QUALITY MANAGEMENT SYSTEM

The seller shall maintain a Quality Management System that complies with the requirements of AS9100, ISO 9001 or a Quality Management System approved by LSI.

The Seller shall notify the Buyer of any changes to the QMS, i.e. certification status, facility relocation, Quality Manager.

Buyer reserves the right to conduct surveillance audits at Seller's facility to determine that Seller's quality system conforms to the requirements of to ISO 9001 or AS9100.

4.8 SQC 107: CONTROL OF CHANGES

The Supplier shall not make changes to the design, configuration, material, part, or manufacturing process that result in an impact to form, fit, or function of the supplied product. These changes must be submitted to the Buyer and require the approval of LSI.

Seller further agrees to insert this clause in Seller's subcontracts for Seller purchased equipment.

4.9 SQC 108: CORRECTIVE ACTION

Seller shall, on request, provide statements of corrective action on forms designated by Buyer on nonconformities or failures of Seller's goods or services. Corrective action statements, at Buyer's option, may require approval signature by Buyer and customer quality representatives.

If the Supplier is issued a Supplier Corrective Action Request (SCAR), the SCAR must be signed by an authorized representative of the company and returned to LSI within the response due time frame. Failure to respond in a timely manner may result in the removal of Supplier from the Approved

Supplier List (ASL). Upon notification of the nonconformance and shipments may be suspended until containment processes are completed.

4.10 SQC 109: NON-CONFORMING MATERIAL

****Supplier does not have Material Review Board (MRB) authority on behalf of LSI. ****

Suppliers shall contact LSI Buyer for any products that require MRB action.

Any quality concerns or rejections as a result of Supplier and sub-tier supplier are the responsibility of the Supplier.

The Supplier shall not deliver any material that departs from drawing, specification or instruction requirements. LSI may chargeback a supplier for rework, repair, analysis and/or travel related to nonconforming product where it has been determined that the non-conformance is caused by supplier or services rendered by sub-tier suppliers.

4.11 SQC 110: CONTROL OF QUALITY RECORDS

Seller's records shall be on file and available for review by Buyer, Buyer's Customers or Regulatory Agencies, upon request. Quality records shall be retained for a minimum of five (5) years from date of final payment, unless otherwise specified in writing. Seller shall have a documented procedure on record retention defining specific records and applicable retention.

4.12 SQC 111: CALIBRATION SYSTEM

The Supplier shall implement and maintain a system for the control and maintenance of measuring and test equipment in accordance ANSI/NCSL Z540-1, ISO 10012 Calibration Systems or equivalent. The Calibration System shall be documented, accountable, and traceable.

Suppliers that provide calibration services are required to comply with ISO/EC17025 quality standard and provide calibration certificate that meet NIST Standards.

4.13 SQC 112: CERTIFICATE OF CONFORMANCE (Special Process Approved Supplier)

A certification is required to be submitted to LSI with the shipment of the product for material subject to "special processes" (such as passivating, welding, chromate, anodize, heat treat, electroplating, paint, non-destructive testing, etc.). It shall include identification of the process by specification number, revision, name of subcontractor (As Required), legible name, signature and certification level or title of the person performing the process, and serial numbers of parts processed (As Required). **See SQC100 for general CoC Requirements.**

4.14 SQC 113: CONTROL OF SPECIAL PROCESSES

Special Processes such as plating, welding, chromate, anodize, heat treat, electroplating, paint, non-destructive testing, etc., shall be in accordance with specifications and standards stated on the drawings and /or purchase order. LSI and/or its customers require certification and approval of special processes.

4.15 SQC 114: SPECIAL PROCESS CERTIFICATIONS

Suppliers shall ensure that all personnel performing such processes as plating, welding, chromate, anodize, heat treat, electroplating, paint, non-destructive testing, etc., are certified in accordance with the specifications contained on the drawings and purchase orders. Suppliers shall also ensure the associated equipment used is certified as appropriate. Supplier shall have personnel performing special processes certified and have evidence of proficiency.

4.16 SQC 115: CHEMICAL / PHYSICAL TEST REPORTS

The Supplier shall provide test reports for each lot must be provided along with the packing sheet. These test reports or copies thereof must provide quantitative evidence that the material(s) shipped meet all the chemical and/or physical properties required by applicable specifications. Test Reports must also provide the following information:

- Manufacturer's Name
- Specification No., Rev. Change and Date
- Lot Number
- LSI PO Number

4.17 SQC 116: DIMENSIONAL INSPECTION DATA

The Supplier shall provide objective evidence, with each shipment, that the deliverable end item conforms dimensionally to contract requirements. Supplier to provide results of inspection performed to determine acceptability of each part delivered. Inspection results shall at minimum include:

- LSI part number and revision
- LSI Purchase Order number
- Supplier part number and revision (As Required)
- Date of test(s) performed
- Serial number(s) and / or lot number(s) as required by drawing / specification / contract, (As Required)
- Required dimension and its tolerance

NOTE: A Certificate of Conformance does not satisfy the requirements of this clause.

4.18 SQC 117: RAW MATERIAL CERTIFICATION

A raw material Certificate of Compliance (CoC) is required. The CoC shall contain a test report showing actual chemical and mechanical properties analysis test data on the lot of raw material used to manufacture the items or raw material shipped against this Purchase Order.

4.19 SQC 118: MATERIAL SUBSTITUTION PROHIBITIONS

All purchased materials and services are subject to inspection for compliance to this purchase order and all applicable quality clauses. No material or process substitutions or quantity variations from the purchase order may be made without prior written authorization from LSI. This clause or provision applies to this supplier and to any of the supplier's sub-tier contractors under this procurement.

Chain of Custody (Disguising intermediate ownership): Suppliers shall not disguise the makeup of material or chain of ownership by removal of previous supplier's name, nomenclature or identification.

4.20 SQC 119: ELECTROSTATIC DISCHARGE (ESD) CONTROL AND PACKAGE

Protection from electrostatic discharge (ESD) damage shall be provided to all Class I, II or III ESD susceptible devices in accordance with the manufacturer's requirements. The protection level provided by the original manufacturer shall extend through all procurement, handling, storage, packaging and shipping phases. ESD shall meet the requirements of ANSI/ESD S20.20 and/or MIL-STD-1686. The packaging shall be clearly labeled to indicate that it contains electrostatic sensitive items.

4.21 SQC 120: RESTRICTION OF HAZARDOUS SUBSTANCES (RoHS)

All components, assemblies and sub-assemblies supplied on this order shall not exceed RoHS limits and must not have a homogeneous presence of materials above the following levels by weight percentage:

- Lead (Pb) <0.1%
- Cadmium (Cd) <0.01%
- Hexavalent Chromium (Hex-Cr) <0.01%
- Polybrominated Biphenyls (PBB) <0.1%
- Polybrominated Diphenyl Esters (PBDE) <0.1%
- Any RoHS compliant component must have 100 ppm or less of mercury and the mercury must not have been intentionally added to the component.

4.22 SQC 121: SOLDERABILITY

All electronics components must have a Certificate of Solderability, or lot date code (or date of manufacture) of less than 2 years old at time of shipment to LSI, or the Supplier shall provide evidence of LSI approved solderability testing prior to shipment.

Certification shall include as a minimum:

- Supplier's name and address
- Solderability Test Specification
- Date Solderability Testing performed
- Date of Manufacture or Date Code
- Solderability performed by
- Manufacturer's Name
- Purchase Order Number
- Purchased Part Number or vendor part number including current revision letter
- Manufacturer's part number (if different from the purchased part number)
- Certification is to be signed and dated by an authorized representative of the company

Note: Solderability testing(s) shall not be more than 24-months old prior to arrival of material at LSI.

4.23 SQC 122: CIRCUIT CARD ASSEMBLY (CCA) / PRINTED WIRING BOARD (PWB)

The following requirements are imposed for the procurement of Printed Wiring Boards (PWBs) and Multilayer Flex Circuits:

- 4.23.1 CCAs will comply with IPC-A-610 Acceptability of Electronic Assemblies unless otherwise specified. CCAs will comply with IPC-J-STD-001 requirements for Soldered Electrical and Electronic assemblies unless otherwise specified.
- 4.23.2 Seller shall not make changes to or deviate from Buyer supplied PWB design without formal engineering change/s approval from Buyer. 4.23.3 Supplier shall maintain records of the performance of each test, inspection or micro sectioning for a period of not less than five (5) years.
- 4.23.4 The following documentation shall be Included with each shipment of CCA's:
- CCA Inspection Report (Final Inspection results)
 - Metallurgical Lab Report consisting of: a) Copper thickness, b) Glass to glass board thickness, c) Di-electric thickness (all layers) (As Required)
 - Certificate of Conformance (CoC)
 - Certificate of Electrical Test (As Required)
 - Serialization log of shipped CCA (As Required)

NOTE: The supplier shall default to Class 2 requirements if the class is not otherwise specified on the PO or other buyer supplied documents.

NOTE: CCA's will comply with IPC-J-STD-001 Requirements for Soldered and Electronic Assemblies unless otherwise specified.

4.24 SQC 123: PURE TIN

The use of Pure Tin is prohibited. Products using a Tin plating must contain at least 3% Lead to prevent Tin Whisker Growth. Parts shall also be free of Zinc, Cadmium and Mercury. Supplier shall provide a written/signed CoC stating compliance.

4.25 SQC 124: PREFERRED FINISH TIN-LEAD

Tin-lead plate or hot solder dip in accordance with MIL-PRF-19500 is the preferred method for lead finish coatings. Seller must request authorization from LSI if another lead finish must be used. Evidence that one of the acceptable hot solder dip processes has been used must be included with each shipment.

Lead Free Solder alloys less than 0.1% lead by weight not listed by J-STD-006 may be used when such use is approved by the Buyer.

4.26 SQC 125: EXCLUSION OF MERCURY AND CLASS 1 OZONE DEPLETING SUBSTANCES (ODS)

Material furnished under this order shall be free from contamination by presence of mercury or any other toxic substance without written approval from LSI.

Use of Class 1 Ozone Depleting Substances (ODS) is prohibited. Class 1 Ozone Depleting Substances include, but are not limited to; Halogens, Chlorofluorocarbons (CFCs), Carbon Tetrachloride (Tetrachloromethane), Methyl Chloroform (1,1,1 – Trichloroethane, and Methyl Bromide, etc. The Supplier shall inform LSI of any products manufactured with or containing ozone depleting substances.

4.27 SQC 126: FIRST ARTICLE INSPECTION (FAI)

A First Article Inspection in accordance with AS9102 is required to be performed prior to shipment of the products. A copy of the FAI documentation shall be included with the delivery.

The Seller shall perform a full FAI, or a partial FAI for affected characteristics, when any of the following events occurs:

- A change in the design affecting fit, form or function of the part
- A change in manufacturing sources(s), process(es), inspection method(s), location of manufacture, tooling or materials, that can potentially affect fit, form or function
- A change in numerical control program or translation to another media that can potentially affect fit, form or function
- A natural or man-made event, which may adversely affect the manufacturing process
- A lapse in production for two years or as specified by LSI

4.28 SQC 127: TEST DATA

Test data is required with each shipment. The test data shall be traceable to the serial number or lots for the each test performed. When testing is conducted by an outside test lab, the test lab shall be traceable and identified on the test data sheets for the tests performed. Test data shall include:

- Supplier's name and address and/or the name and address of the independent laboratory
- LSI purchase order number
- Date of test performed
- Product number, serial number or lot number (as applicable)
- Acceptance criteria used
- Results of tests performed
- Supporting documentation
- Supplier's QA representative approval with signature, title, and date

4.29 SQC 128: SOURCE INSPECTION

Source Inspection is required prior to shipment. LSI reserves the right to re-inspect or retest all items covered by this purchase order. Final acceptance will be made at LSI facility. A copy of LSI Source Inspection Documentation shall be attached to the shipping document and accompany the material.

The Supplier shall furnish, at no cost, the necessary facilities, equipment, data and perform tests or assist LSI in performing tests as required by applicable drawings, specifications, and inspection instructions.

The Supplier shall notify LSI's purchasing department at least ten (10) working days prior to the date the source inspection is required. If LSI waives the source inspection, the inspection waiver must be in writing and accompany the shipment.

4.30 SQC 129: GOVERNMENT SOURCE INSPECTION (GSI)

Government Source Inspection is required prior to shipment. The Supplier shall furnish, at no cost, the necessary facilities, equipment, data and perform tests or assist in performing tests as required by applicable drawings, specifications, and inspection instructions.

Final acceptance will be made at LSI facility. The Supplier shall comply with the requirements of Federal Acquisition Regulation (FAR) Clause 52.246-2, "Inspection of Supplies."

The Government reserves the right to re-inspect or re-test all items covered by this purchase order.

4.31 SQC 130: SAFETY DATA SHEET (SDS)

Safety Data Sheets (SDS) shall be supplied with shipments of any product that contains polymers, solvents, reducers, adhesives or other materials prone to outgassing volatile organic compounds (VOC's). In addition, if the supplier is aware of any additional precautions and/or handling requirements, the supplier is requested to submit those safeguards with the SDS.

4.32 SQC 131: TRACEABILITY

The seller shall maintain a method of item traceability that ensures tracking of the supply chain back to the manufacturer of all parts included in assemblies and subassemblies being delivered per this order. This traceability method shall clearly identify the name and location of all of the supply chain intermediaries from the manufacturer to the direct source of the product for the seller and shall include the manufacturer's batch identification for the item(s) such as date codes, lot codes, serializations, or other batch identifications.

4.33 SQC 132: LOT CONTROL

All items delivered to LSI must maintain Job/Lot traceability. The Supplier will not co-mingle different date codes or production lots, nor combine resubmitted parts with new production parts. Parts may be submitted in one shipment provided the different date codes and lots are identified and segregated. All accompanying documentation such as packing list, certifications, inspection / test reports shall include the lot control number.

4.34 SQC 133: SERIALIZATION

Materials procured by this purchase order shall be uniquely serialized. Individual serial numbers or number series shall be marked on the CoC. Serial numbers must be recorded on the Suppliers shipping documentation or pack sheet.

4.35 SQC 134: FUNCTIONAL TEST REPORTS

Supplier shall furnish to LSI a legible functional test report/data sheet, which shows the actual results (values) obtained during functional testing performed on each unit of production. The test report shall identify the part number and drawing revision, test requirement, individual products by serial number, actual test results, pass/fail results and shall include the name and signature for the Supplier's authorized representative responsible for quality and be included with each delivery of products on this contract.

4.36 SQC 135: RADIOGRAPHIC INSPECTION

Parts shall be X-rayed in at least two orientations to determine the approximate size and location of defects, if any. Parts may be identified using permanent ink (i.e., Black or Blue Sharpie) and shall be traceable to inspection data and X-ray. X-rays and their protective envelopes shall be labeled with:

- Purchase Order number
- Part Number(s)
- Serial Number(s). When required by Purchase Order items will be identified with unique serial numbers.
- Orientation/view angle (i.e., Top, Side, and End views and/or 0 deg., 90 deg.).

The x-ray film and one copy of the x-ray report must accompany the material. The x-ray film must be identified with the buyer's PO number and the report shall contain the signature and title of a responsible representative of the laboratory.

5.0 DEFINITIONS

Table 1 – Definition Table

No.	Abbreviation	Definition
1	PO	Purchase Order
2	CoC	Certificate of Compliance / Conformance. A document given to Buyers to show that the goods or services bought or supplied meet the required specifications/standards

6.0 DOCUMENT CHANGE CONTROL

Table 2 - Revision History

Revision Number	Date of Release	Approver	Description
-	02 March 2021	Dave Crosby	Initial Release
1	09 February 2022	Dave Crosby	Clarifying requirements in section 2 and 4