



Supply Chain Quality Assurance Supplier Quality Control Requirements (QC Clauses)

The following clauses, when specifically referenced in the Purchase Order by number, form a part of the Purchase Order in addition to all other clauses, terms, and conditions, drawings and specification, which are made a part of the Purchase Order. Unless otherwise specified, specifications referenced herein shall be of the issue in effect on the date of the request for quotation.

1. **Government Source Inspection (GSI)** – is required prior to shipment from your plant. Upon receipt of this order, promptly notify the government representative who services your facility so that appropriate planning for government inspection can be accomplished. If a government representative does not service your plant, contact the Defense Contract Management Command (DCMC) for direction. In the event that the government representative or office cannot be located, contact the Telephonics Purchasing Department immediately. Evidence of GSI may be a requirement for each shipment.
2. **Telephonics Source Inspection** – Please note that clause 2 shall be accompanied by one of the sub requirements listed below and shall apply to all materials and services supplied under the Purchase Order. Supplier shall notify Telephonics Purchasing Department (or Field Representative specified in the Purchase Order) that Product is ready for source four (4) days prior. Evidence of inspection must accompany shipment. If the supplier elects to utilize automated testing programs for final acceptance, proof must be supplied to Telephonics that the program is capable of fully testing material to the drawing requirements. A single verification prior to testing of the first lot of material may normally suffice, unless significant modifications are made to the program that in the opinion of Telephonics requires re-verification.

Readiness for Source Inspection – supplier is responsible for assuring products are ready for Telephonics' inspection at the scheduled time. Should a Telephonics representative be required to cancel source inspection after their departure, the supplier is subject to time and travel charges incurred by such Telephonics representative. Supplier's readiness shall include making available all test and inspection documentation including P.O. and drawings, inspection/test equipment, and necessary personnel required to complete the Source Inspection.

- 2.1 **Source Verification** of Qualification Test, Reliability Demo, Burn-in, and Production Sampling is required. (Note: QC Clause 2. is also invoked in conjunction with this clause.)
 - 2.2 **Inspection of work-in-process** at points selected by Telephonics QA is required. The points shall be detailed in a Statement of Work (SOW), Purchase Order (PO), or supplemental documentation. (Note: QC Clause 2. is also invoked in conjunction with this clause.)
 - 2.3 **Pre-Cap Visual Inspection** is required prior to closure as detailed in Statement of Work (SOW), Purchase Order (PO) or supplemental documentation. (Note: QC Clause 2. is also invoked in conjunction with this clause.)
 - 2.4 **Final Inspection/Test** prior to shipment is required. Telephonics shall validate the Final Insp/Test to insure that all items/services are compliant to the required specifications. (Note: QC Clause 2. is also invoked in conjunction with this clause.)
 - 2.4.1 **No Longer Used – Use QC 30.1**
 - 2.4.2 **No Longer Used – Use QC 30**
 - 2.5 **No Longer Used – Use QC 6.9**
 - 2.5.1 **No Longer used – Use QC 6.9**
 - 2.6 **Physical Configuration Audit (PCA)** is required prior to delivery from your facility. The PCA prerequisites shall be defined by Telephonics in a Statement of Work as defined under Clause 8 (SOW required). (Note: QC Clause 2. is also invoked in conjunction with this clause.)
 - 2.7 **No Longer Used**
3. **Quality Assurance Management** – the supplier shall maintain an effective quality program in accordance with the applicable clause indicated below for all material and services supplied under the Purchase Order.



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The supplier's calibration system shall conform to ISO 10012-1, ANSI/NCSL Z540-1 or equivalent. MRB authority (use as is or repair) is not granted for this Purchase Order.

The supplier shall develop and maintain a product recall system (traceable to the serial number/date code, location, and date of manufacture) which is capable of notifying Telephonics of any circumstances that might affect the integrity of products previously delivered.

Telephonics reserves the right to perform surveys and audits necessary to assure conformance to the Quality Assurance requirements of the latest P.O. issue in effect unless otherwise noted. Telephonics also reserves the right to request Corrective Action for Quality System or material noncompliance.

The use of "Part Brokers" for the acquisition of any parts or materials on this Purchase Order is permissible only if the independent distributor/broker is approved by Telephonics. A "Part Broker" is a non-approved Telephonics supplier that is not a manufacturer or an authorized distributor of the product. The proposed use of a non-Certified Parts Broker must be approved by Telephonics prior to acquiring the item. The supplier is responsible for the successful completion of all additional testing that may be required to obtain approval. The approval process must be submitted to the buyer. Quality clause 3.7 is applicable as well as this clause.

3.1 No Longer Used

3.2 No Longer Used

3.3 No longer used

3.4 No longer used.

3.5 **Supplier's Compliance** to AS9100 or ANSI/ASQC/ISO 9001. Supplier shall have a quality program that complies with the Aerospace Standard 9100 or American National Standards Institute/American Society for Quality Control (ANSI/ASQC) document ANSI/ASQC/ISO 9001, "Model for Quality Assurance in Design/Development Production, Installation, and Servicing."

At Telephonics Request, the supplier is subject to periodic audit/assessment of their quality program to ensure compliance to AS9100 or ANSI/ASQC/ISO 9001 requirements.

If Telephonics accepts AS9100/ANSI/ASQC/ISO 9001 registration and in the event the seller changes registrars, loses registration status, or is put on notice of losing 3rd party registration status, the seller shall notify Telephonics within three (3) days of receiving such notice from their registrar. (Note: QC Clause 3 is also invoked in conjunction with this clause.)

3.6 No longer used.

3.7 **Counterfeit Material Acquisition and Control**

Suppliers shall have a fully documented Counterfeit Parts Control System that complies with AS6174A. Suppliers shall ensure that only new and authentic materials are used in material delivered to Telephonics. Suppliers shall only purchase material directly from original manufacturers; manufacturer franchised distributors, or authorized aftermarket manufacturers. Use of material that was not provided by these sources is not authorized unless first approved by Telephonics. Suppliers shall maintain a method of commodity and item level traceability that ensures tracking of the supply chain back to the manufacturer of all material being delivered. Traceability methods shall clearly identify the name and location of all supply chain intermediaries from the manufacturer to the direct source of the material for the supplier and shall include the manufacturer's commodity or item level identification for the item(s) such as date codes, lot codes, heat codes, serializations, unique item identifiers, or batch identifications. The supplier's system must be fully documented and is subject to review and approval by Telephonics.



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Counterfeit Parts Control Program Electronic Parts - The Supplier shall have a counterfeit electronic part detection and avoidance system that complies, at a minimum, with each of the twelve (12) system criteria outlined in paragraph (c) of DFARS clause 252.246-7007. The supplier's system must be fully documented and is subject to review and approval by Telephonics. The Supplier shall have a counterfeit electronic part detection and avoidance system that complies, at a minimum, with AS5553. The supplier's system must be fully documented and is subject to review and approval by Telephonics.

Parts procured from Independent Distributors (IDs)/Brokers are permitted only if the ID/Broker has been pre-qualified by the Defense Logistics Agency (DLA) and listed on the DLA's Qualified Suppliers List of Distributors (QSLD) or Qualified Testing Suppliers List (QTSL). Procurement from IDs/Brokers who are not pre-qualified and listed by the DLA is not permitted without the express written approval of Telephonics' Quality Assurance Department. Telephonics approval will require testing to be performed by a Telephonics-approved test facility for part authentication/verification prior to inclusion in any product to be supplied to Telephonics.

3.8 Counterfeit Parts Control for Distributors

The distributor's counterfeit electronic part detection and avoidance system must be fully documented and is subject to review and approval by Telephonics.

3.8.1 Franchised/Authorized Distributors shall have a documented system that defines processes used to prevent the purchase and distribution of counterfeit electronics products. The system shall meet the requirements of SAE AS6496.

Documented Certificates of Conformance that are traceable by lot to the Original Component Manufacturer (OCM) shall be provided with each lot delivered.

3.8.2 Independent Distributors/Brokers must be pre-qualified by the Defense Logistics Agency (DLA) and listed on the DLA's Qualified Suppliers List of Distributors (QSLD) or Qualified Testing Suppliers List (QTSL).

5. Change Control (Ref: Mil-Std-480/973) – is applicable to all material supplied under the Purchase Order. Any changes in design, manufacture, materials, performance, processes, Quality Assurance procedures, manufacturing location, test, or service incorporated after initial Telephonics approval must be submitted to Telephonics Purchasing/Subcontracts for notification at a minimum, with subsequent approval required based on commodity type. Class I changes requires Telephonics approval. Class II changes require notification and concurrence from Telephonics. COTS material will only require notification for class II. Subsequent Telephonics approval may apply if agreed contractually. Build-to-print will always require notification and subsequent Telephonics approval. Supplier format for change submittal is acceptable.

5.1 No Longer Used

6. Objective Evidence of Quality – must accompany all material and service delivered under the Purchase Order. The certificates and data must indicate the Telephonics Purchase Order number and must be approved by the seller's Quality Assurance Department. This data must be maintained for a ten year period after completion of the order or as specified on the Telephonics Purchase Order.

6.1 Certificate of Compliance stating that all materials, parts processes, and services used in the manufacture meet Purchase Order requirements and that substantiating certificates are on file. (Note: QC Clause 6. is also invoked in conjunction with this clause.)

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



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- 6.1.1.1** Manufacturer's Certificate of Compliance traceable to product supplied. (Note: Quality Clause 6.0 and 6.1 are invoked in conjunction with this clause.)
- 6.1.2** **Certificate of Calibration** is required for each item delivered indicating that the equipment is in calibration and is traceable to NIST. (Note: QC Clause 6. is also invoked in conjunction with this clause.)
- 6.1.3** **Special Process Certifications** must accompany all material delivered under this Purchase Order. Supplier shall furnish a certification for all special processes used to fabricate/ manufacture the item including those performed by any sub-tier supplier. When special processes are subcontracted, the seller must use NADCAP approved suppliers. Supplier shall furnish a certification for all special processes used to fabricate/manufacture the product supplied including those performed by any subcontracted supplier. All certificates and data must indicate Telephonics' Purchase Order number, Telephonics' Part Number, serial number (if applicable) or date codes (if applicable), the special process used, and applicable specifications. The seller/subcontractor's Quality Assurance Department must sign and/or stamp the Certificate of Special Processes. Special Processes are defined as: anodizing, plating, chemical film, welding- fusion or spot, brazing- dip or vacuum, chemical milling, heat-treating, non-destructive testing (NDT), (Note: QC Clause 6. is also invoked in conjunction with this clause.)
- 6.1.3.1** No longer used – combined with 6.1.3
- 6.1.4** **A Certificate must accompany all Dip Brazed** assemblies delivered under this Purchase Order. The Certificate must indicate Telephonics P.O. number, Telephonics Part Number, Serial Number (if applicable) or date codes (if applicable), and that the part or assemblies meet the following cleanliness requirement:
- Each assembly shall exhibit cleanliness to the extent that flux residue (chloride, fluoride, etc.) will not exceed five (5) PPM when measured over the entire brazed assembly, or in any specific area.*
- The seller's Quality Assurance Department must sign and/or stamp this document.
- 6.2** **Variable Data** (Measured Values) must accompany all items delivered, showing conformance to all inspection/tests specified in the Telephonics purchase Order, or applicable specifications (SCD/SOCD) or Telephonics approved ATP. (Note: QC Clause 6. is also invoked in conjunction with this clause.)
- 6.2.1** **Mechanical Data** – Mechanical data (measured values) is required with each shipment and shall be traceable to serial number, lot number, or date code as required. (Note: QC Clause 6.2 is also invoked in conjunction with this clause.)
- 6.2.2** **Electrical Data** – Electrical data (measured values) is required with each shipment and shall be traceable to serial number, lot number, or date code as required. (Note: QC Clause 6.2 is also invoked in conjunction with this clause.)
- 6.3** **Attribute Data** (Go, No Go) for each lot delivered showing conformance to all inspections/tests specified in applicable specifications (SCD/SOCD) or Telephonics ATP. (Note: QC Clause 6. is also invoked in conjunction with this clause.)
- 6.3.1** **Attributes Data** – supplier shall supply attribute data with each lot delivered as follows:
- a) Microcircuit and semiconductors (non-Mil-Spec) shall consist of number tested; number rejected for environmental screens, as called out in the procurement control drawings, PDA attributes data and P.O. number.
- b) Resistors, capacitors and other electrical parts (non-Mil-Spec) shall consist of number tested, number rejected for screening tests as called out in the procurement control drawing, and P.O. number.
- (Note: QC Clause 6. is also invoked in conjunction with this clause.)
- 6.4** **Screening Results** per Mil-Std-883, Method 5004, indicating the name and location of the facility at which the screening was performed shall accompany each shipment. (Note: QC Clause 6. is also invoked in conjunction with this clause.)



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6.4.1 Microcircuits

- a) Microcircuits shall be quality level “B” or better of Mil-PRF-38535.
- b) Screening of microcircuits shall be in accordance with Mil-Std-883, Method 5004, Class “B” with a PDA<10%. Qualification Testing shall be in accordance with Method 5005.
- c) Supplier shall be on the current Qualified Manufacturer’s Listing (QML) suppliers for QPL-38535.
(Note: QC Clause 6. is also invoked in conjunction with this clause.)

6.5 PROMS – Programmable Read-Only Memories must meet the following requirements:

- a) Burn-in shall be in accordance with Mil-Std-883, Method 1015, and Condition D after programming.
- b) Electrical Tests shall include marginal “O”s testing for programming re-verification.
- c) Programming equipment shall be calibrated daily for proper pulsing conditions.
- d) PROM part marking shall be unique and traceable to vendor lot numbers.

(Note: QC Clause 6. is also invoked in conjunction with this clause.)

6.6 Particle Impact Noise Detection (PIND) – all microcircuits, hybrids, and semiconductors with an internal cavity shall be capable of passing PIND testing in accordance with Mil-Std-883, Method 2020, and Mil-Std-750, Method 2052 respectively. (Note: QC Clause 6. is also invoked in conjunction with this clause.)

6.7 Data supplied in accordance with 6.2, 6.2.1, 6.2.2, 6.3, 6.3.1, 6.4, 6.4.1, 6.5, and 6.6 must show dates of inspection (or processing), limits and conditions, and yield (quantities submitted and Accept/Reject data) (Note: QC Clause 6. is also invoked in conjunction with this clause.)

6.8 Key Characteristic Data - Measurement Data is required for each Key Characteristic specified by the PO, Drawing or SCD for each item delivered and shall be traceable to a serial number, lot number, order number or date code as required. Using Telephonics Datasheet E-SOP400.12 Appendix A, Supplier shall complete and forward to Telephonics with shipment, the required Key Characteristics data. (Note: QC Clause 6. is also invoked in conjunction with this clause.)

6.9 AS9102 First Article Inspection Report (FAIR) - First Article Inspection (FAI) shall be performed by the Supplier in accordance with the requirements of AS9102 and Telephonics Supplier Requirements for the Preparation of AS9102 First Article Inspection Reports TCX-9102 located at <https://www.telephonics.com/uploads/standard/TCX-9102.pdf>

All First Article and Partial First Article Inspection reports shall be prepared and submitted utilizing the Net Inspect system.

First Article Inspection shall be required for any of the following:

1. New part representative of the first production run.
2. Change in the design affecting the fit, form or function of the part.
3. Change of the location point of manufacture or other changes that can potentially affect the fit, form and function of the part including but not limited to, changes of the manufacturing source(s), process(s), tooling or materials.
4. Natural or man-made event, which may adversely affect the manufacturing process.
5. Lapse in production for two years or as specified by Telephonics.
6. Supplier can utilize Qualification units to complete the AS9102 report, in the event changes occur from qualification units to production units a delta AS9102 FAI shall be required, and submitted to the Buyer.

Additionally, Telephonics reserves the right to require an AS9102 FAI from the Supplier when any of the following occurs:

1. TC Customer contract requirement
2. When a partial FAI is triggered per AS9102 requirements, or
3. As deemed necessary by Telephonics based on poor historical performance or risk.



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7. **Standards of Workmanship** – the supplier must maintain written standards of workmanship directly applicable to the nature and level of work to be performed under the Purchase Order. In addition, the supplier shall develop, implement, and maintain training programs as deemed necessary by the supplier’s management to maintain acceptable areas of performance in quality control, purchasing, and manufacturing. Upon request, a copy of the workmanship standard shall be supplied to Telephonics Purchasing/Subcontracts.
- 7.1 **The material and workmanship** shall conform to the latest revision at the time of the RFQ, of Mil-Hdbk-454, requirements 5 and 9, and applicable “Pass down” requirements written within the standards (requirement 17, printed wiring, etc.). (Note: QC Clause 7. is also invoked in conjunction with this clause.)
- 7.2 **Commercial Workmanship** shall be in accordance with the latest revision at the time of the RFQ, of IPC-A-610, Class 2, at the time of the RFQ. (Note: QC Clause 7. is also invoked in conjunction with this clause.)
- 7.3 **Workmanship** shall be in accordance with latest revision at the time of the RFQ, of IPC 610-Class 3 (Note: QC Clause 7. is also invoked in conjunction with this clause.)
- 7.4 **Workmanship and Process Control** shall be in accordance with the latest revision at the time of the RFQ of J-Std-001. (Class 3 compliance required) (Note: QC Clause 7. is also invoked in conjunction with this clause.)
- 7.4.1 **Workmanship and Process Control** shall be in accordance with the latest revision at the time of the RFQ of J-Std-001. (Class 2 compliance required). (Note: QC Clause 7. is also invoked in conjunction with this clause.)
- 7.4.2 No longer used.
- 7.4.3 **Workmanship and Process Control** shall be in accordance with the latest revision at the time of the RFQ, of IPC-A-620, Class 3. (Note: QC Clause 7 is also invoked in conjunction with this clause.)”
- 7.4.4 **Workmanship and Process Control** shall be in accordance with the latest revision at the time of the RFQ, of IPC-A-600, Class 3. (Note: QC Clause 7 is also invoked in conjunction with this clause.)
- 7.4.5 **Foreign Object Damage (FOD) Awareness.** The supplier shall develop and maintain a FOD policy and program consistent with NAS 412. The policy shall as a minimum provide for effective housekeeping, management of material, inspection of in process and final assemblies. Upon request, the supplier shall provide a copy of the policy to Telephonics for review.
- 8.0 **Statement of Work (SOW)** – When an SOW applies to this order; the supplier is responsible to comply with all SOW requirements. All questions or concerns regarding the SOW must be forwarded, in writing prior to performance of the subject order to Telephonics Purchasing/Subcontracts department. Proposed changes to the SOW require approval from Telephonics Quality Engineering.



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- 8.1 No Longer Used
9. **Casting Requirements** – Castings shall meet all applicable drawing requirements. An inspection report listing actual measurements of all dimensions must be supplied with the first article of the initial order. A chemical, physical, and X-ray analysis representing each melt, and heat shall be supplied with each shipment. All castings supplied shall not exceed applicable limitations of porosity, distortions, shifts, and corrosion and shall meet dimensional requirements. Repairs shall not be made to defective items without prior approval from Telephonics Quality Engineering Department.
10. **Welding Qualification** – fusion welding shall be performed by welders certified to AWS D17.1 Resistance welding and machines shall be certified to AMS-W-6858.
11. **Radiographic Inspection** – shall be performed in accordance with AMS-STD-2175 and ASTM E 1742. The seller shall furnish X-rayed film and TWO copies of the laboratory report, identifiable to the items X-rayed, with each shipment.
12. **Magnetic Particle / Penetration Inspection** – as applicable, shall be performed in accordance with ASTM E 1444 or ASTM E 1417; certified test reports shall be submitted with each shipment. Personnel performing inspections shall be certified in accordance with NAS 410.
13. **Chemical/Physical Certification** – shall be furnished with each shipment. The heat, batch, melt numbers, etc., shall be included in the certificate.
14. **Certified Light Test Data** – the seller shall take light measurements in accordance with the applicable specification and furnish data, which includes high and/or low readings, identifiable by Serial Number and/or date codes to the delivered items. Method of measurement and data correlation is subject to Telephonics approval.
15. **Limited Life Material** – seller shall identify each item, package, or container with the manufacturing date and shelf life expiration date. Rubber products shall be identified as to cure and mold date. In no case shall material be supplied with more than 20% of its useful life expired.
- 15.1 Suppliers shall apply a permanent label that contains the manufacturing/cured date and the expiration date to all age sensitive materials. Supplier shall provide a C of C certifying the age sensitive material meets or exceeds 80% of its shelf life.
16. **Failure Reporting, Analysis And Corrective Action System (FRACAS)** – the Supplier shall have a documented system for failure (reject) reporting, analysis and corrective action that meets the following minimum requirements (based on ANSI/AIAA S-102.1.4-2009):
- Electronic Database – a record of all failures to the lowest level possible; maintained for historical analysis and reporting.
 - Trend Analysis – perform periodic analysis and summarization of failure data to identify trends and recurring failures using statistical techniques for analyzing, summarizing and presenting the trend data with defined performance thresholds for corrective action.
 - FRACAS Report – timely reporting of each failure occurrence capturing detailed information, providing for item and data traceability and including factors that may have affected performance and any other information that accurately characterizes the failure.
 - Closed-loop Corrective Actions System – a documented process for containment, prompt root cause analysis, and corrective and preventive action with feedback loop for continuous improvement; including provisions for verifying the effectiveness of corrective actions taken.

Should a failure(s) occur during Telephonics (TC) Qualification testing, Acceptance test or during Field test operations, the following actions shall be taken by the supplier upon receipt of the failed unit(s):

- a) Determine the direct cause of failure(s) within 2 business days (i.e. to lowest level possible) and submit preliminary report with containment actions to TC Procurement Representative.
- b) Determine the root cause of the failure and submit the corrective actions/plan, for approval by Telephonics, within 15 business days to TC Procurement Representative. Final report due within 30 days.



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Reporting – responses to Telephonics requests for failure analysis shall be forwarded to the Telephonics Procurement Representative within the dates specified. As a minimum, the response should include containment action(s) to be taken, direct and root cause analysis and corrective and preventive actions planned/taken.

Telephonics reserves the right to have the supplier repeat any tests necessary to verify the corrective action, and to direct the scheduling of retests, the data to be taken, and the extent of reconditioning needed for the purpose of these tests. A failure is defined as any condition which causes any of the item(s) performance characteristics to be outside of the contract specification requirements at any specified environmental condition, or as further specified by the requirements of the applicable test.

16.1 Failure Analysis – Component Level

The supplier shall perform a failure analysis to the component level, on all items that fail Telephonics Qualification, Reliability Testing, Acceptance Testing, and/or as a result of internal failure trend analysis. The results of such failure analyses shall be included as part of the response required by Clause 16. The supplier shall notify the Telephonics Procurement Representative when, due to the complexity of the failure, the 30-day turnaround time for root cause corrective action cannot be achieved. (Note: QC Clause 16 is also invoked in conjunction with this clause).

16.2 Supplier Corrective Action Request - When requested, the Supplier shall conduct and document a thorough root cause analysis of the defects/failures found and implement and document effective corrective actions (and preventive actions where necessary). When the Eight Disciplines (8D) method is required per the Supplier Corrective Action Request (SCAR), the Supplier shall comply with the requirements of standard AS13000 “Problem Solving Requirements for Suppliers” and utilize the template/checklist contained within to ensure an acceptable RCCA was conducted and documented.

17. Acceptance Test Procedure – No longer used.

18. No longer used

19. Traceability

a) Traceability Identification by Lot – shall be Telephonics’ QCI-55Q-005 and QCI-5F-001. The supplier must complete Form QCI-5F-007.

b) Traceability Identification by Serial Number shall be furnished in accordance with the provisions of Telephonics’ QCI-5F-015.

19.1 Traceability Identification by Serial Number for Off-Load Vendors shall be furnished for each item contained within each top-level deliverable assembly. As Built Lists (ABLs) shall be provided containing serial number and revision of said items. For Circuit Card Assemblies the date code for the bare printed circuit board shall also be listed on the ABL’s.

19.2 Traceability Identification for Circuit Card Assemblies (CCA’s)- All Build to print CCA’s delivered on this purchase order require the serial numbers and date code of the assembled CCA on the suppliers Certificate of Conformance. Serialization to be assigned by supplier using a 3 character alphanumeric prefix to identify supplier as defined on the drawing or SOW. (COTS supplied items may use their own serialization method.) Supplier shall be responsible for maintaining internal traceability on bare PWB date/lot code and serial number usage on CCA level serial numbers delivered.

20. Printed Circuit Bds/Flex Prints Special Marking – Mark permanently and legibly with Telephonics Vendor Code Number followed by the 4 (four) digit Date Code (Week and Year) in an area free of circuitry.

21. Packaging/Handling –The supplier shall handle and package material in a manner that will assure protection against corrosion, oxidation, deterioration, ESD damage and physical damage during shipment to Telephonics. Bulk packaging may only be used if and when the component lead integrity is maintained and material is protected against damage. ESD protective packaging shall be used for all electronic components.

All packaging and identification methods/processes shall comply with the requirements outlined in Telephonics document TCX1138.

21A. Static Sensitive Devices: ESD protective Packaging requirements of unit packs of Class I and Class II items as defined in the latest revision of Mil-Std-1686 and ANSI/ESD S20.20 shall conform to the following:

1. Protection shall be provided to prevent physical damage and to maintain leads and terminals in the manufactured condition under handling and transportation environments. Materials used for the protection shall be non-corrosive and provide protection against triboelectric generation of static electricity. Conductive shunting foam, bars, or clips shall be applied on electrical connectors to short all connector pins and the connector together.

2. To provide protection from electrostatic voltage sources of at least 4,000 volts in the form of field or direct discharge, unit packs shall be enclosed in ESD protective material that is qualified to MIL-PRF-81705 Type 1 and procured from a source that is listed on QPL-81705.

3. Outer surface of the package shall be marked with the following caution note or other marking approved by Telephonics.

Caution Note

Observe Precautions for Handling Electrostatic Discharge Sensitive Items



Protection

4. Equipment and/or materials purchased for ESD control shall have Certificates of Compliance to latest version of ANSI/ESD S20.20.

21.1 Components Packaged in Trays – All components shall all be placed in the same orientation in relation to a reference point or part marking on the body of the component

21.2 PCB Packaging – Each lot of printed circuit boards by part number shall be vacuum packed with moisture indicator.

21.3 Part Packaging/Preservation – Parts shall be packaged and preserved IAW MIL-STD-2073-1D

21.4 UID Package Marking- When applicable by SOW, drawing or SOCD UID package marking shall be in accordance with Mil-Std-130 or requirements as stated on drawing. Reference TCX-1138 for proper packing identification criteria.

21.5 RFID Package Identification -RFID package identification shall be in accordance with requirements as stated on drawing, purchase order, or SOW.

21.6 Circuit Card Assembly Packaging-Unless otherwise specified in the Purchase Order or Statement of work the supplier shall package Circuit Card Assemblies to be shipped to Telephonics in a manner that will assure protection against corrosion, electrostatic discharge damage (ESD), oxidation, deterioration and/or damage during shipment. Each Circuit Card Assembly (CCA) shall be individually packaged in an ESD bag and placed in an ESD container. Each container shall have a Protection



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ESD symbol on the exterior surface. The container exterior surface shall also be made of ESD materials and comply with ANSI/ESD-S541 and ANSI/ESD S20.20. The interior container shall also provide proper cushioning material to preclude damage to the CCA if dropped from six feet.

- 21.7 Harness, and Cable Assemblies (Rigid, Semi rigid, Flex, Flat, and Ribbon) Packaging - Unless otherwise specified in the Purchase Order or Statement of work the supplier shall package Harnesses, and Cable Assemblies to be shipped to Telephonics in a manner that will assure protection against corrosion, electrostatic discharge damage (ESD), oxidation, deterioration and/or damage during shipment. Each Harness and Cable Assembly shall be individually packaged in an ESD bag. All connectors must be covered with ESD dust caps. Each bag must be packaged in an individual ESD container (container must have protection ESD symbol on the exterior) that contains sufficient ESD cushioning material to preclude damage to the Harness, or Cable Assembly if dropped from six feet.
22. **Mil-S-19500F Semiconductor Devices**
- a) Purchase Orders to Device Manufacturers** – the following statement applies:
- During performance of this order, your quality control or inspection system and manufacturing processes are subject to review, verification, and analysis by authorized Government representatives. Government stamping of lot Traceability documentation is required. Government release of shipment is not required unless notified.
- b) Purchase Orders to Other Suppliers** – the following statement applies:
- During performance of this Order, your control of devices lot Traceability documentation and your inventory control for Mil-S-19500F JAN branded devices are subject to review, validation, and verification by an authorized Government representative. Government release of shipment is not requires unless you are otherwise notified.
23. **Software Quality Program** – the supplier’s software quality program shall conform to the requirements of the applicable standards and Telephonics specifications. Telephonics retains the right of review and disapproval of the program.
- 23.1 **The Software Development & Documentation Program** shall be in accordance with RTCA DO-178C and the latest revision of RTCA DO-248 at the time of the Purchase Order. (Note: QC Clause 23. is also invoked in conjunction with this clause.)
- 23.2 **The Aerospace System & Software Development Program** shall be in accordance with the latest version of SAE AS9100 and the latest revision of AS9115 at the time of the Purchase Order. (Note: QC Clause 23. is also invoked in conjunction with this clause.)
- 23.3 **The Firmware Quality Program** shall be in accordance with the latest revision of RTCA DO-254 at the time of the Purchase Order. (Note: QC Clause 23. is also invoked in conjunction with this clause.)
- 23.4 No longer used.
- 23.5 **The System & Process Maturity** shall be in accordance with the latest revision of ~~SEI~~-CMMI for Development (CMMI-DEV) at the time of the Purchase Order. (Note: QC Clause 23. is also invoked in conjunction with this clause.)
- 23.6 **The Software Quality Program** shall be in accordance with ISO 9001:2008 and the latest revision of ISO 90003 at the time of the Purchase Order. (Note: QC Clause 23. is also invoked in conjunction with this clause.)
- 23.7 **A Software Quality Program** acceptable to Telephonics is required. (Note: QC Clause 23. is also invoked in conjunction with this clause.)
- 23.8 **Programming Record** supplier shall provide a record of all programmed items and required test programs. Each item shall be listed with its version and checksum or other verification criteria. Examples are altered items, programmed microcircuits, flashed memory, and downloaded software, custom BIOS and ATE/STE programs. (Note: QC Clause 23. is also invoked in conjunction with this clause.)



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- 23.9 Program Data** All Telephonics provided media files or other programming information shall be returned to Telephonics upon completion of programming effort. All media used must contain indication of both Telephonics Configuration and Software Quality Engineering approvals. (Note: QC Clause 23. is also invoked in conjunction with this clause.)
- 24. Printed Circuit Boards shall be IAW IPC-6011 and IPC-6012 class 3** unless otherwise specified on Telephonics drawing. The supplier shall complete the required inspections/tests and maintain the data on file for three years. This data shall be made available to Telephonics upon request: Micro-sections of each panel of the delivered lot will be provided to Telephonics for review and approval. The Vendor may request the micro-sections back or a retention agreement with Telephonics for the 3-year maintenance period. Any panels that have a CCA fail for voids must have a failure analysis performed and submitted with the lot to Telephonics to justify shipment of the remaining pieces on each panel with any voids. A C of C is also required for electrical testing performed by the supplier. Telephonics may request electrical Data in the event internal trace open issues are identified during processing at Telephonics.
- 24.1 Printed Circuit Boards** – a solder sample representative of the lot processes shall be submitted with each date code and/or part number supplied under this order. This sample shall only be used for Solderability testing and can be a piece of a board rejected for other issues.
- 24.2 Solder Mask Height Requirement** – For printed circuit boards the solder mask height of bumps surrounding the via holes shall be no higher than .002” above the solder mask coating.
- 24.3 Surface Finish** – Unless otherwise specified on the fabrication drawing, exposed copper finish shall be Immersion Gold over Electroless Nickel (ENIG) IAW with IPC-4552.
- 24.4 Cleanliness** –Each lot of printed circuit boards shall meet the cleanliness requirements of IPC-6012 after final processing. Actual numeric data must accompany each lot.
- 25. Non-Standard Parts Approval** – the supplier must apply to Telephonics Corporation for approval for the use of non-standard parts and materials in accordance with Mil-Std-965.
- 26. QML Requirement** – the Mil, AN and MS parts supplied against this Purchase Order shall be manufactured by only QML sources. The inclusion of products from the QML does not relieve the supplier of their responsibility to provide supplies, which meet all specification requirements, or to perform all inspections and tests specified for such material
- 27. Interchangeability** – all items purchased under this purchase order are to be completely interchangeable. Any deviation to any of the supplier’s design, processes, or procedures requires prior approval by Telephonics.
- 28. Industrial/Military Applications:** For products and services used in an Industrial /Military environment the following clauses shall apply: 3, 3.5, 3.6, 6, 6.1, 21, 26, 27. For semi-conductors procured to Mil-S-19500F, the following clauses apply: 3, 3.5, 3.6, 5, 6, 6.1, 21, 22, 26, and 27. All supplied material must be NEW and UNUSED with Certificates of Conformance traceable to the original manufacture. Component Lead material or finish containing Alloy 42, and Solder process utilizing the following; Sn-3.4Ag-4.8Bi, Sn-3.4Ag-1Cu3.3Bi, & Sn-58Bi as identified in GEIA-HB-0005-2 are strictly prohibited.
- 29. Items not subject to Quality Assurance** – No quality clauses are applicable to the parts/services on this P.O.
- 30. Advanced Quality Planning and Control Plan** – A Control Plan (CP) shall be developed detailing the quality control/assurance methods and techniques used in the Seller’s processes for delivery of compliant hardware under this Purchase Order/Contract. It shall include the critical product/process characteristics, process controls, measurements, inspections and tests and the associated actions to be taken to ensure process control and capability. The Plan shall be used during production to ensure stability and capability of associated processes utilizing proven methods such as FMEA, SPC and mistake-proofing.



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The CP shall be submitted to the “Buyer” prior to use on production deliverable hardware and whenever changes are made to reflect the current methods of control, assurance and measurements systems used. Review and approval of the initial CP and any changes shall be through the “Buyer’s” Supplier Quality Assurance group. The seller’s Quality Assurance Procedure Manual, when specified, shall also be provided with the Plan.

- 30.1 Process Maturity Assessment (PMA)** is required during the manufacture of goods for this contract. The PMA will be utilized to identify and evaluate compliance to contract requirements and aid with supplier’s continuous improvement process. . This clause does not take precedence over other Buyer requirements.
- 31. Commercial Applications**– for products and services used in a commercial environment, the following clauses shall apply: 3, 3.5, 3.7, 6, 6.1, 21, and 27. All supplied material must be **NEW** and **UNUSED** with Certificates of conformance traceable to the original manufacture. Component Lead material or finish containing Alloy 42, and Solder process utilizing the following; Sn-3.4Ag-4.8Bi, Sn-3.4Ag-1Cu3.3Bi, & Sn-58Bi as identified in GEIA-HB-0005-2 are strictly prohibited.
- 32. Measurement and Test Equipment** – All purchased or rented Measurement and Test equipment received at Telephonics must be routed through Telephonics Metrology Department. Address labels and invoices must contain the statement “Attn: Metrology Department” to insure proper routing at the Telephonics Facilities.
- 33. Returned Material Vendor Service** – the material specified on this Purchase Order has been rejected by Telephonics Corporation and is subject to rework or replacement. Reworked or replaced items must meet all of the requirements specified on the Telephonics original Purchase Order The following quality clauses are invoked by this clause: QC 3.0, 3.5, 3.7, 5, 6.0, 6.1, 6.1.1, 6.1.3, 6.1.4, 6.2.2, 7.1, 16.0, 16.1, 16.2, 21, 21A, 21.6, 33.1, 36.0, 36.1. If parts are from a distributor the following clauses also apply. 3.8, 3.8.1, 3.8.2
MRB authority for repair or use as is decisions is not granted to the supplier for this purchase order. If conditions exist which cannot be restored to the original configuration and functionality the supplier must notify Telephonics and request authority via the use of a Supplier Variance Request (SVR).
- 33.1 Source Inspection, Vendor Service** – Source Inspection requirements may be invoked on rejected material, which is returned to the supplier for rework or replacement against this order. Supplier shall notify Telephonics Purchasing Department prior to shipment of reworked or Replaced Items to verify source inspection status. Reworked or Replaced items shall meet all of the original Purchase Order requirements. Reworked or Replaced items must appear and function as new equipment
- 33.2 No Longer Used**
- 34. COTS/Modified COTS Supplier Reliability Requirements** - The supplier shall comply with the SOCD/SCD to assure the item’s reliability requirements are met, unless tailored by the Telephonics Purchase Order or Statement of Work.
- 34.1 Materials, Parts, And Processes** - The materials, parts, and processes used in the design of the item shall be selected on the basis of reliability, maintainability, producibility, safety, logistics considerations, and service history. All materials shall be non-toxic, self-extinguishing, or nonflammable. The use of components shall be limited to those available from multiple sources to the maximum possible. Evidence of compliance shall be via Certificate of Compliance provided by the Supplier.
- 34.2 Reliability** - A Reliability prediction based on Mil-Hdbk-217 Notice 2 or equivalent shall be supplied to Telephonics, using the following guidelines:
- Quality factor of 1.2 for plastic encapsulated microcircuits (PEMs)
 - Quality factor of ‘R’ for industrial grade passive components
 - Quality factor of ‘JAN’ for industrial grade semiconductors
 - Use vendor supplied reliability life test data for major ICs (processors, memories, ASICS, etc.)
- 34.3** In lieu of the above, the vendor shall supply sufficient part data information to allow Telephonics to perform the prediction.
- 34.4 Reliability** - Environmental stress screening (ESS)
The vendor shall perform ESS on all delivered items as specified in the P.O. and/or SOW. ESS profiles shall include temperature, vibration, and functional tests, and shall be made available for Telephonics’ Reliability for approval prior to the start of ESS Testing.



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35. **Marking** - Items shall be marked legibly and permanently. Marking requirements shall include the following:
- Supplier's identification or Cage code.
 - Electrostatic sensitivity identification marking, if applicable.
 - Identification of reference designation and polarity as required.
- 35.1 **For Source Control Drawings (SOCDs)**, When applicable by SOW, Specification or SOCD Telephonics Part Number, Serial Number, and SOCD Revision shall be marked on the item.
- 35.2 **For Specification Control Drawings (SCDs)**, Suppliers' Part Number, Serial Number, and Suppliers' Revision will be marked on the item.
- 35.3 **Serialization** - Serial numbers shall consist of 4 to 10 alphanumeric characters. The last four characters shall be numeric. The serial numbers must be consecutively numbered even if the dash number changes. Once assigned a serial number must not be changed or duplicated even if the end item is lost or scrapped
- 35.4 **UID Marking** **UID marking** shall be in accordance with Mil-Std 130 or requirements as stated on drawing. Samples of UID marking shall be provided to Telephonics for approval prior to delivery of product.
36. **Lead Free Soldering Requirements (Parts/Components)**
When design requires the use of leaded components, the Supplier shall provide as part of the Certificate of Compliance a statement specifying that the material provided under the Telephonics Purchase Order(s) is NOT lead free and complies with the following criteria:
- All components and parts shall be free of solder, plating, coatings, and claddings that exhibit either of the following:*
- 1. Material composition greater than 97% tin.*
 - 2. Tin alloy with composition of less than 3% lead.*
- Supplier is required to notify buyer when any change in product or part number is made or planned which would incorporate Lead Free (Pb) finish or solders by means of Telephonics Supplier Variation Request form.
- 36.1. **Lead Free Soldering Requirements (Sub-Contractors/Turn Key; Telephonics design)**
When design requires the use of leaded components, the Supplier shall provide as part of the Certificate of Compliance a statement specifying that the material provided under the Telephonics Purchase Order(s) is NOT lead free and complies with the following criteria:
- All products supplied shall be free of solder, plating, coatings, and claddings that exhibit either of the following:*
- Material composition greater than 97% tin.*
Tin alloy with composition of less than 3% lead.
- The supplier shall supply a "Lead Free" Control plan or procedure that shall include as a minimum:
- Requirement to flow Lead free (Pb) requirement to subtier suppliers.
 - Receiving inspection criteria for measuring/validating part lead finish.
 - Tracking of lead free parts procured by the supplier.
 - Tracking of Lead free (Pb) parts through the manufacturing process.
- Supplier is required to notify buyer when any change in product or part number is made or planned which would incorporate Lead Free finish or solders by means of Telephonics Supplier Variation request form.
37. **Rework Data**
Seller is required to provide to Telephonics, in Seller's format, consumption and failed component data for each reworked item. The data shall include, but not be limited to:
- Identify reworked item by part number, nomenclature, and serial number. Make note if the failure was confirmed or could not be duplicated.



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2. List rework actions taken: For example: Replaced R1 on A2 board.
3. Identify any subassembly that was removed and replaced by part number, nomenclature, and serial number.
4. Identify any consumable parts that were replaced by part number, nomenclature, and quantity.
5. If parts were inter-changed from other items, Seller shall provide part number and serial number (if applicable) of the parts interchanged and identifies the originating item by part number and serial number.

38. **No longer used**