

**Supplier Quality Clauses  
LIST -020**

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By accepting a Purchase Order (PO) from Curtiss-Wright DS, Inc. Newtown, PA (CWDS NTW), Supplier agrees to comply with the Quality Clauses below, as listed for each PO line item. Terms and Conditions (Ts&Cs) and other requirements are listed at [www.CurtissWrightDS.com/about/Customr-and-Supplier-information/Newtown](http://www.CurtissWrightDS.com/about/Customr-and-Supplier-information/Newtown). Any allowed exceptions to these requirements are documented on an individual Supplier basis. Noncompliant receipts will be rejected and returned at Supplier's expense.

**TTC-01.1 through TTC-10.1** (Intentionally Omitted)

**TTC-11.1** (Transitioning to QA:39)

**TTC-12.1 through TTC-20.1** (Intentionally Omitted)

**QA:01 Electrostatic Discharge (ESD) Control**

All items on this Purchase Order, unless otherwise noted, require ESD handling per ANSI/ESD S-20.20 (latest release) ESD Control System for protection of Electrical and Electronic Parts, Assemblies and Equipment. Packaging shall be clearly identified as containing ESD sensitive materials. All items shall be packaged in ESD protective bags, tubes, or film.

**QA:02 CWDS NTW (TTC) Drawings**

Parts referenced on this purchase order are to be manufactured to the specifications called out by the applicable CWDS NTW drawings. As part of the acknowledgement process, Suppliers are required to ensure that they have the drawing revision referenced on this purchase order, and to contact CWDS NTW before fulfilling the purchase order if the drawing revision referenced has not been provided.

**QA:03 Domestic Specialty Metals**

Suppliers of Domestic Specialty Metals (CWDS NTW Part Numbers beginning with "5101" or "5106") must provide objective evidence (Certificate of Compliance and Material Test Reports) that they have supplied compliant specialty metals in accordance with DFARS 252.225-7008 and -7009.

**QA:04 Supplier Retained Quality Records**

Records of the work performed on this purchase order are to be documented and maintained by the Supplier as formal quality records. The Supplier shall retain and control these records for a period of ten (10) years. Copies of these documents shall accompany every delivery to CWDS NTW. CWDS NTW and its Customers may request an audit of records and/or facility of the Supplier. This activity shall take place within 5 to 10 working days.

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**QA:05 Certification of Material/Coating Type**

Supplier shall provide a Certificate of Conformance (C of C), stating that raw materials and/or coatings and/or paints used during manufacturing of items on this purchase order are in accordance with applicable specifications as referred to or furnished within this purchase order.

A Mill material cert & the Plater's, Coater's and/or Painter's C of C if applicable shall be supplied with each shipment.

The results of all chemical and physical tests, as well as other evidence that shows acceptability of raw materials and/or coatings and/or paint shall be supplied with each shipment. These records shall also be maintained on file for inspection at any time during normal business hours for a period of ten (10) years as part of the Supplier Retained Quality Record. CWDS NTW retains the right to audit the results of chemical and physical tests conducted by the Supplier.

**QA:06 Packaging and Identification of Finished/Painted Items**

Items shall be packaged in such a manner as to prevent damage, nicks, gouges, scratches or other defects during shipment from the Supplier to CWDS NTW. Packaging materials shall be adequate to ensure that part-sweating and/or moisture accumulation does not occur during shipping. Parts received must be properly identified by the CWDS NTW part number listed on the Purchase Order. Acceptable means of identification include bag-and-tag, labeling on the outside of packing materials, or any other method that allows identification of individual parts. Parts referenced on this purchase order are to be manufactured to the specifications called out by the applicable CWDS NTW drawings. As part of the acknowledgement process, Suppliers are required to ensure that they have the drawing revision referenced on this purchase order, and to contact CWDS NTW before fulfilling the purchase order if the drawing revision referenced has not been provided.

**QA:07 Supplier's Subcontractor Control**

All Supplier procured supplies/services which become a part of the item(s) delivered in accordance with this Purchase Order shall conform to drawing(s) and specification(s) requirements. Supplier's system shall assure: Purchase Order flow down of applicable quality and technical requirements, Suppliers' capability to produce items and adequate methods of assuring compliance. Supplier shall flow down and verify requirements of supplies/services they subcontract.

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**QA:08 Requirements for Supplier Submitting Inspection and/or Test Data Documentation**

Supplier shall provide objective, written evidence of hardware conformance to Purchase Order requirements with each shipment. Recorded data shall include not only results of all routine inspections and tests, but in addition, any special selection tests, conditioning (burn-in) tests, lot acceptance tests, sampling tests or any other test used to determine conformance. If Supplier is a distributor of the item(s) in this Purchase Order, then Supplier shall require the same performance documentation from the original manufacturer of the item(s). Additionally, Supplier shall secure from that manufacturer a right for CWDS NTW to acquire or inspect (at CWDS NTW's option) all pertinent data in that manufacturer's possession showing the item's compliance to all specifications.

The exact format of the submitted data is not critical, but shall contain the following minimum information:

1. Supplier's name and address
2. CWDS NTW's part number and CWDS NTW's Purchase Order number (and PO revision number, if applicable)
3. Drawing revision level
4. Number of items in lot
5. Number of items inspected
6. Manufacturer's Name
7. Lot number and date code (if applicable)

The Supplier shall submit either attributes data or variables data, at Supplier's discretion, unless variables data is specifically requested by the CWDS NTW. The Supplier's format is acceptable. As a minimum, attributes data shall include the parameter inspected, the tolerance and a summary of the inspection test results. Variables data shall include, at a minimum, the parameter inspected, the tolerance, and the measurement obtained for each item inspected. Data sheets and/or test reports shall bear evidence of acceptance by Supplier's signature (or stamp) and date signed.

The submission of inspection and/or test data as provided herein shall not modify or limit any representations, warranties or commitments made elsewhere or in any way affect the obligation of the Supplier to perform strictly in accordance with the provisions of this Purchase Order. The requested data is to be retained by the Supplier for a period of ten (10) years after the date of the completion of this Purchase Order, unless otherwise specified in the Purchase Order.

**QA:09 Date/Lot Code Shipping Requirements**

Each shipment shall consist of material from only one manufacturer and a single date coded or numbered lot. If Lot/Date Codes are not available due to use by the Manufacturer of unique serial numbers in lieu of Lot/Date Codes, the serial numbers shall be noted on shipping documents. For certain metal products such as screws, nuts, washers, and the like, HEAT number is acceptable.

With CWDS NTW concurrence, multiple manufacturer and date-coded lots may be included in one shipment provided that they are segregated, packaged and identified separately.

Each different Manufacturer and date-coded lot must be documented as a separate line number on the shipper, and the shipper or other suitable documentation must document the following minimum information:

1. Manufacturer Name
2. Lot/Date Code (or serial number as above if applicable)
3. Manufacturer P/N
4. Country of Origin
5. Quantity

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**QA:10** (Intentionally Omitted)

**QA:11 Conformance Certification**

The Supplier shall provide certification with each shipment that all quality, conformance, and other applicable requirements have been met in accordance with the specification(s) stated in the item description/part number appearing on this Purchase Order. The certification shall be signed (or duly authenticated via approved alternate means) by the corporate officer who has management responsibility for the production of the product, or other designated responsible individual.

As a minimum, the following information shall be included in the conformance certification:

1. Purchase Order Number (CWDS NTW PO number)
2. Purchased Part Number (as shown on the PO)
3. Manufacturer's P/N, if different from above
4. Manufacturer (NOT Distributor)
5. Authorized Signature per the above

**QA:12 Exclusion of Pure Tin Finishes**

Electronic, electrical, electromechanical, and mechanical piece parts and assemblies, including the internal fabrication of hardware, delivered to CWDS NTW under the provisions of this Purchase Order shall not have pure tin finishes. Additionally, any tin-lead (SnPb) plating or solder process/processing shall result in a finish of no less than 3% lead composition. Note: This applies to component leads and terminations, carriers, bodies, cages, brackets, housings, mechanical items, hardware (nuts, screws, bolts), etc. This does not apply to MIL-SPEC Parts or CWDS NTW Drawings that allow the use of Tin (Sn) with less than 3% Lead (Pb).

Supplier shall provide a Certificate of Conformance (C of C) with each shipment. The C of C shall mean that the Supplier or Supplier's agent has verified that delivered product meets the above listed composition requirements, or the material meets at least one of the following provisions:

- a. Supplier or Supplier's agent has contacted the Original Equipment Manufacturer (OEM) and verified that the specific Mfr / Lot Date Code of delivered product meets the specified minimum lead (Pb) requirement if Tin (Sn) is present in the product.
- b. Supplier or Supplier's Subcontractor has verified by actual sample testing (X-ray Fluorescence testing is preferred) or other industry acceptable method that a minimum of 3% lead (Pb) is present in any process that uses tin (Sn).

Supplier shall be responsible for managing the compliance with this requirement with subcontractors or sub-tier Suppliers and provide evidence of the appropriate flow-down and management of this requirement to the satisfaction of CWDS NTW. Unless otherwise specified in this quality attachment, all exceptions must be authorized in writing by CWDS NTW.

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**QA:13 100% Surge Current Testing for Surface Mount Tantalum Capacitors**

Any surface mount tantalum capacitor furnished to CWDS NTW under the provisions of this Purchase Order shall be subjected to and pass surge current testing in accordance with the conditions specified below. This requirement shall apply to loose components (piece parts), circuit card assemblies (CCAs), modules and any other type of hardware or product that contains surface mount tantalum capacitors. If Supplier is unable to comply with these requirements, Supplier shall contact CWDS NTW for further direction prior to proceeding.

**Flow Down Requirements:**

Supplier shall be responsible for communicating this requirement to subcontractors or sub-tier Suppliers as required to assure that non-surge current screened product is not delivered.

**Certificate of Conformance:**

Supplier shall provide a signed Certificate of Conformance or an equivalent signed document that specifies that delivered product contains only surface mount tantalum capacitors that have been subjected to and passed surge current testing. This Certificate of Conformance or equivalent document proving the passing of surge current testing also requires at a minimum the following information:

1. Manufacturer Name
2. Lot/ Date Code
3. Manufacturer P/N
4. Country of Origin
5. Quantity

**Screening Conditions:**

All surface mount tantalum capacitors shall be subjected to and pass surge current testing per MIL-PRF-55365J, paragraph 4.7.18, Surge Option "A" or better.

**QA:14 Fiber Optic Inspection Criteria**

Photographic evidence is required to be submitted with every fiber optic assembly supplied. This will ensure that the end termini of each assembly were inspected to meet the inspection criteria that CWDS NTW will employ during incoming inspection. Two zones will be examined which include A (the inner core), B (the cladding). Failure conditions are outlined in tables A.1 through A.5 of IEC 61300-3-35:2022. The Supplier is to use the Visual Requirements Table that is applicable to the connector that is identified on the Purchase Order.

**QA:15 Part Substitutions Not Allowed**

The Supplier shall furnish items of the exact manufacturer's part number specified on the CWDS NTW purchase order that were fabricated by the exact manufacturer specified on the CWDS NTW purchase order. Substitutions that offer "alternate" or "equivalent" items that do not meet these requirements are not permitted unless specifically authorized by CWDS NTW via Purchase Order amendment.

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**QA:16 Configuration Change Reporting**

The Supplier shall maintain control over the item configuration in each of the following categories:

- a. Methods, procedures, materials, planning and/or sequencing used in the manufacturing, processing, assembly, inspection and/or test of an item,
- b. Location of the site where some or all of the work on items is being performed,
- c. Source or processing (applicable to Supplier outsourced materials and/or services),
- d. Performance specifications and/or capabilities of the item,
- e. Qualification status of the item,
- f. Commercial availability of the item (part obsolescence notification),
- g. Internal configuration of the item including materials used, dimensions, thicknesses, component placement, sensitivity to environments, utilization of lead-free components, etc., and
- h. Electrical interconnection including pin assignments, I/O functions, addition/removal of functional features, inclusion of 'advanced' or 'hidden' features, etc.

Configuration control shall be established during the initial procurement of the item, and shall be maintained throughout the life of the item. Appropriate configuration data and Customer-specific part numbers shall be generated by the Supplier for the item to provide positive identification and control of all configuration parameters and to ensure that items provided in subsequent purchases will match the original configuration status.

**QA:17 PWB Microsection Analysis**

The Supplier shall run coupons on all multilayer boards and shall submit a copy of the microsection analysis form with each order. The Supplier shall keep all microsection buttons for a period of ten (10) years.

**QA:18 Foreign Object Damage (FOD)**

Suppliers of FOD sensitive articles shall establish procedures to control and eliminate Foreign Object Damage and/or contamination during manufacturing, assembly, test and inspection operations. The FOD program shall be subject to review and approval by CWDS NTW.

**QA:19 Preproduction Panelization Requirements**

**The Pre-Production Panelization Scheme must be approved by Raytheon before board fabrication is allowed to begin, unless other specific arrangements for this approval have been coordinated with the Raytheon PDE.**

**The PCB manufacturer shall provide panelized data for review prior to the first build of a revision of that part number. Any change to the panelized data will require a new review of the panelized data by Raytheon. Refer to Raytheon's 61494 (latest rev).**

**QA:20 PWB Manufacturing and Testing**

All boards shall be tested and manufactured in accordance with the applicable document listed on the drawing. Unless otherwise specified on the drawing, the most current revision and Class 3 requirements shall be used. All testing, except those items specifically identified as being done by an approved testing laboratory, shall be conducted by the Supplier at their facility or one that meets IPC-QL-653.

**QA:21 Copper Tensile and Elongation Testing**

Copper tensile and elongation testing shall be conducted quarterly. Results shall be available upon request.

**QA:22 Coupon Evaluations**

Refer to Raytheon's 61494 (latest rev).

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**QA:23 Corrective Action Requirements**

Supplier is obligated to support an investigation into any discrepancies or systematic quality concerns identified by CWDS NTW or the Supplier pertaining to the goods or services being supplied and which CWDS NTW formally requests via CWDS NTW's corrective action form. CWDS NTW may generate this request at any time prior to or subsequent to, delivery of the goods or services being supplied. The Supplier response shall be furnished within the time requested via the applicable corrective action form and shall state all actions to be accomplished by the Supplier to correct the issue and prevent recurrence.

**QA:24 Quality System Compliance**

The Supplier shall establish and maintain a quality system that complies with International Organization for Standardization. For example, ISO 9000, AS9100/9110/9120 ISO 17025 or equivalent as applicable to the product or services they provide.

CWDS NTW reserves the right to conduct surveillance at the Supplier's facility to determine that the Supplier's quality system meets the requirements of the quality standard as set forth herein. Acceptance of this order includes the support of onsite quality and process audits to be conducted as determined necessary by CWDS NTW.

CWDS NTW's approval of the Supplier's system does not constitute acceptance of goods or services, nor relief of purchase order or subcontract requirements.

**QA:25 Notification of Process Changes**

The Supplier shall notify CWDS NTW of any proposed or inadvertent changes to the manufacturing procedures, work instructions, travelers, manufacturing process procedures and inspection and test procedures within 5 working days of knowledge of such changes.

**QA:26 Inspection Reports Submittal Required**

The Supplier shall provide inspection reports at the time of delivery for every item on this purchase order every time that it is manufactured. Reports shall include test and/or inspection procedure document number and revision level, part number inspected; serial, lot batch, or date code numbers as applicable; identification of each inspection point; the results of each inspection point, and; the identification of the person performing the inspection. Inspection results outside of the required limits that have been accepted shall reference the CWDS NTW Quality Notification (QN) by which the departure was accepted.

**QA:27 Traceability of EEE Parts**

A method of traceability that ensures tracking of the supply chain back to the manufacturer of all EEE components and devices being delivered on this order. This traceability method shall include the identification of all intermediaries from the manufacturer to the direct source of the product for the Supplier. Each intermediary back to and including the manufacturer shall be identified by including the company name and location, lot batch code, date code and all applicable serial numbers. Traceability shall be made available to CWDS NTW within 5 working days of such a request.

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**QA:28 Conformance Certification**

The Supplier shall provide certification with each shipment that all quality, conformance, and other applicable requirements have been met in accordance with the specification(s) stated in the item description/part number appearing on this Purchase Order. The certification shall be signed (or duly authenticated via approved alternate means) by the corporate officer who has management responsibility for the production of the product, or other designated responsible individual.

As a minimum, the following information shall be included in the conformance certification:

1. Purchase Order Number (CWDS NTW PO number)
2. CWDS NTW Part Number (as shown on the PO)
3. Manufacturer's P/N, if different from above
4. Manufacturer (NOT Distributor)
5. Authorized Signature per the above
6. Manufacturer serial number or Lot date code
7. The manufacturers/OEM C of C must be supplied with the shipment.
8. Authorized Distributors must certify that they are an Authorized distributor for the OEM.
9. Quantity of Items delivered

**QA:29 Coupon Evaluations**

One thermally stressed A coupon per panel shall be evaluated. In addition, one thermally stressed B coupon per panel shall be evaluated for each drill/plating step. Two registration coupons per panel per drill step shall be evaluated. These coupons shall come from opposing corners of the panel. In the case where B coupons are used for registration evaluation, two B coupons must be evaluated per drill step, each coming from opposing corners and opposing axis. The fabricator shall have a micro section test report from a DLA Land and Maritime-VQE DSCC approved independent lab showing applicable compliance to IPC-6012, MIL-PRF-55110 or MIL-PRF-31032 requirements. A copy of this test report shall be delivered to CWDS NTW with the PWBs on this order.

**QA:30 Nonconformance Disposition**

PWB and Metalwork fabricators do not have the authority to disposition nonconformances such as "use as is" or "repair" without the written approval of CWDS NTW.

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**QA:31 No Changes Without Approval**

The Supplier is required to inform CWDS NTW in writing of all changes (Class I) which affect form, fit, function, safety, weight, maintainability, service life, reliability, replaceability or interchangeability of the item(s) to be delivered to CWDS NTW.

All Class I changes require CWDS NTW approval prior to implementation by the Supplier.

- Prior to receipt of written authorization from CWDS NTW for Class I changes (or written concurrence from CWDS NTW that a proposed change is a Class II change), the Supplier shall not incorporate any Engineering change which affects CWDS NTW's, Supplier's or Governmental specifications or engineering drawings in any item of this purchase order.
- This includes any Acceptance test procedures or Product Specification changes, or other technical requirements imposed towards the acceptance of the procured item.
- All Class II engineering changes shall be submitted for information and concurrence of classification from CWDS NTW.

Note: Class II changes do not require prior approval by CWDS NTW but do require concurrence in the classification.

Any advance coordination for the Supplier proceeding "at their risk" does not constitute any acceptance of the risk or implied agreement to the change and is for information and coordination purposes only. The Supplier shall be liable for any costs incurred by CWDS NTW, including any retrofit costs, which result from misclassifying the engineering change or from implementing the engineering change without authorization (Class I) or concurrence (Class II), as applicable.

**QA:32 Packaging of Printed Circuit Boards and Moisture Sensitive Devices**

Suppliers shall package Printed Circuit Boards (PCB) in Moisture barrier bags compliant to IPC-1601 (Latest revision). Moisture Barrier Bags type D are not permitted. Reference - Typical Packaging Material Types.

Moisture Sensitive Devices (MSD) Levels 2 and above packaged per J-STD-033 (Latest revision).

Bags are to be vacuum sealed, contain desiccant and a humidity indicator card. All J-STD labeling fields properly completed. The Supplier of these items must provide the following information on the labeling:

- Manufacturer
- Part Number
- Lot/Date Code
- Quantity
- Moisture Sensitivity Level (MSL)
- Reflow Peak Body Temperature
- Date Bag is sealed
- In addition, for PCB:
  - Recommended storage conditions Temp/RH (example  $\leq 30^{\circ}\text{C}/60\% \text{RH}$ ).
  - Allowed exposure time before baking is required or bake when HIC exceeds \_\_\_\_ %.
  - Recommended Baking criteria, temperature and time to bake.

**QA:33 Independent Testing**

Refer to Raytheon's 61494 (latest rev).

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**QA:34 NFD Testing/Inspection Requirements**

With each shipment, the Supplier shall provide hard copy test results for the requirements listed below. Each test document shall be labeled with Lot/Date Code, CWDS NTW part number, person performing the test, the date of the test and the result of the test, (pass/fail, no anomalies, etc.).

Minimum required testing:

- Visual Inspection: All components
- Component Photos: 3 per Lot/DC
- Radiological Inspection: All Components
- Radiological Images: 3 per Lot/DC
- Scanning Electron Microscopy: 1 per Lot/DC
- Package Configuration and Dimensions: 20 per Lot/DC. If less than 20 components, all shall be measured.
- MQ XRF Elemental Analysis: 3 per Lot/DC. Add MQ and Material Analysis if MQ < 3.
- STFRm 3:1/Ambient Swipe): 3 per Lot/DC
- STFRs (Acetone/Ambient Swipe): 3 per Lot/DC
- Scrape Test: 3 per Lot/DC
- Solderability Test: 3 per Lot/DC. If parts fail Authenticity Testing or are found to be suspect counterfeit, do not perform.
- STFRs (Dynosolve/120C 30M Soak & Swipe): 3 per Lot/DC
- Decapsulation/Die Verification: 3 per Lot DC

**QA:35 (Intentionally Omitted)****QA:36 Customer Furnished Material****36.1 Raytheon**

These material, parts or components shall have traceability to the manufacturer.

1. The manufacturer shall be identified on the item, packaging, reel or incoming paperwork.
2. Traceability shall be provided in the form of a serial number, lot number or Lot/Date Code.

**QA:37 CUI Data Transmission**

All CUI (Controlled Unclassified Information) data transmissions shall be compliant to 48 CFR 252.204.7012 and 48 CFR 252.204.7008.

Data transmissions that are not applicable to the CFR's listed are to be considered self-deleting.

**QA:38 Calibration Activities**

Calibration activities shall comply with ANSI/NCSS Z540-1 (latest revision) or ISO/IEC 17025 (latest revision). Objective evidence of certification to one of these National Standards shall be provided by Supplier based on certification and expiration dates.

**QA:39 First Article Inspection (Previously TTC-11.1)**

Items produced on this Purchase Order require First Article Inspection (FAI) per AS9102 (current revision) or other suitable CWDS NTW pre-approved means. FAI shall be performed on the first item produced of the initial production, first item produced after a revision change, and first item produced after a two-year production gap. A copy of the report shall be included with the shipment.

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**QA:40 Shelf Life of Materials / Manufacture Date**

Age sensitive material shall have a minimum of 50% shelf life remaining from its manufactured date/cure date prior to shipment to CWDS NTW unless otherwise agreed in writing by CWDS NTW. Age Sensitive material shall be labeled with manufactured date and manufacturer's batch/lot number.

**QA:41 Counterfeit Parts Prevention**

The Supplier shall not provide electronic components, or assemblies containing electronic components, procured from Independent Distributors without approval from CWDS NTW. Approval from CWDS NTW is required prior to the use of all products from independent distributors.

The Supplier shall maintain a Counterfeit Part risk mitigation process internally, and with its suppliers, using SAE AS5553 and/or AS6174 as a guide. Supplier shall provide evidence of their risk mitigation process upon request.