

## Terms and Conditions

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### REQUIREMENTS FOR PRINTED WIRING BOARDS/FLEX CIRCUITS

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

1. Seller is responsible to perform a review of data and/or artwork furnished by Buyer. Seller shall contact and submit Boeing "Supplier Information Request" form or referring form stated in the purchase contract to Buyer in the event of any difference between drawing, data and/or artwork.
  - 1.1. Data and/or artwork shall be verified for adequacy to assure that Seller is able to meet all requirements of the master drawing. Seller shall not make changes to or deviate from Buyer supplied PWB design without formal engineering changes incorporated into the contract by Buyer's Authorized Procurement Representative.
  - 1.2. Test Coupons, when supplied with the Gerber Data, shall be considered an integral part of Buyer's PWB design.
  - 1.3. When Buyer furnishes Gerber Data in a 274X format or with ".TIF" check plot files, there is no requirement for Buyer to approve Seller's artwork plots.

When Buyer furnishes Gerber Data without 274X formatting or without ".TIF" check plot files, Seller shall submit artwork plots to Buyer's Authorized Procurement Representative for approval by Buyer's Design Engineering Group prior to PWB fabrication. Seller shall contact Buyer's Authorized Procurement Representative to obtain mailing address to submit artwork plots.
  - 1.4. When Gerber Data is furnished without test files, Seller shall extract and use an electrical test file from Buyer's original Gerber data.
  - 1.5. When older designs rely on "Vault Master Artwork", Seller shall verify working tools prior to fabrication.
2. Automated Optical Inspection (AOI) shall be verified on inner layers and outer layers (after final etch). AOI Certification shall be provided when requested, with reference to original design data, Gerber data, or Master artwork with each shipment.
3. All coupons, cross-sections, Destructive Physical Analysis (DPA) specimens, etc., must be traceable to individual printed-wiring boards (PWB).
  - 3.1 When Buyer specification BSPS-23-001, D950-10837-1, D950-10270-1, IPC-6012, IPC-6013, or IPC-6018 are invoked, Seller shall submit the following to Boeing Huntington Beach M&P (CAGE 18355). Seller shall contact Buyer's Authorized Procurement Representative to obtain mailing address for submittal of coupons, microsections, DPA boards and test specimens. Referee testing in accordance with IPC specification must be approved by the Boeing Huntington Beach M&P (CAGE 18355) or by the Boeing Program Design Authority.
    - Solderability test coupons (i.e. M or W, S coupons).
    - Solder mask adhesion test coupons (i.e. G coupons).

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- Structural integrity coupon microsections (i.e. A, AB, B, AB/R, A/R, prorogated B coupons as per the procurement specification).
  - Seller shall include full registration pairs for each drill or plating step.
- When DPA is invoked on the procurement documentation, or Buyer specification, Seller shall submit DPA structural integrity microsections after thermal stress, solder mask adhesion DPA test sample, and solderability DPA samples.

The following shall be retained by the Seller.

- Unused test coupons.
- Any solderability test samples above those required in the procurement documentation.

3.1.1. A copy of Buyer's Lab Report will be furnished to the Seller within a week of receipt of the complete set of test samples and Seller's Structural Integrity Acceptance (or Group A) Test Report.

- Seller's Structural Integrity Acceptance Test Report must be completed and include the Purchase Contract number, the PWB Part Number, lot code, date code, and its Revision Status (i.e. Revision Letter or Number), all ECNs invoked on the Purchase Contract, solderability test results, and solder mask adhesion test results.
- The starting lot quantity and finished lot quantity of PWBs shall be provided.
- Provide a list of all PWB panel serial numbers deemed acceptable. Seller shall include the reject causes for all serialized PWBs that failed at acceptance testing.
- Seller shall submit Structural Integrity Acceptance (or Group A) Test Report digitally when lab packages are ready for delivery to Boeing. Please contact Buyer for information regarding where to send the digital reports.
  - When the test coupons, DPA specimens are ready to ship, please scan the test report for each lot, along with the shipping tracking number (PDF) and submit electronically via email to Boeing Huntington Beach M&P (CAGE 18355). This will expedite the review process time. (A copy of the shop traveler must be provided along with certifications, when requested)
- Part numbers, serial numbers, date code, and lot number/work order must be recorded on the Seller's shipping documentation or pack sheet.

3.1.2. Buyer Lab approvals are required *prior* to shipment.

3.1.3. Seller shall provide a copy of Buyer's Lab Report with each shipment.

3.2. Multilayer boards and flex circuits require Boeing Huntington Beach M&P (CAGE 18355) approval prior to any further assembly operations (e.g., next assy. level, heatsinks, etc.). Test coupons and microsections shall be shipped to Buyer for analysis and approval by Boeing Huntington Beach M&P (CAGE 18355) prior to subsequent assembly operations. Seller shall contact Buyer's Authorized Procurement Representative to obtain mailing address for submittal of test coupons and microsections.

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4. When Buyer Source Inspection clause is imposed on this contract, Seller shall promptly notify Buyer's Supplier Quality Representative (SQR) to identify Buyer source inspection points. All assets, certifications, contract and contract changes, drawings, engineering change notices, specifications, and shipper shall be submitted at the time boards or flex circuits are presented for Buyer's source inspection.
5. Seller's electrical test certifications shall include contract number and changes, part number, procurement specification and a record of equipment used for testing along with the serial numbers, date code and/or traceability data and results for all items tested. Results shall record pass and/or failure characteristics, including shorted networks, isolation defects, or open networks.
  - 5.1. The electrical test machine used for product acceptance shall be identified along with settings for isolation and continuity tests, including voltage and resistance parameters, test file description and test method (fixtures, bed-of-nails, moving probe, etc.) along with machine calibration status. Specific machine settings shall be recorded.
  - 5.2. Test certifications must include a description of the test procedure used for troubleshooting and/or manual testing. All testing, including re-testing from troubleshooting or manual testing, shall result in 100% successful completion of continuity and isolation testing requirements.