Qualitel

# Specification for Printed Circuit Boards
# PUR-1001

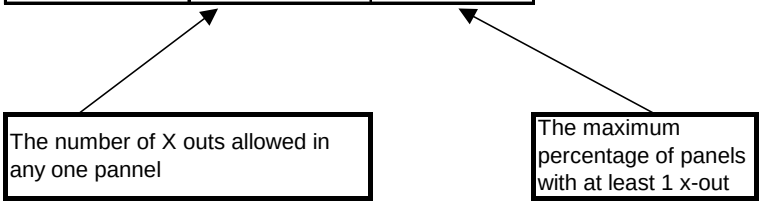
The purpose of this specification is to outline specifications for production of printed circuit boards to assure that incoming printed circuit boards (PCB) meet Qualitel Hillsboro's requirements.

1. Acceptance criteria not specifically detailed in customer documentation, this specification, in a separate agreement, or on a purchase order shall be assumed to conform to the standards laid out in IPC-6012, IPC-A-600, IPC-9252, and IPC-1601 (current revision) for Assembly, Inspection, Test, and Packaging respectively. All criteria shall meet class 2 requirements, unless otherwise specified. ***NOTE: Customer specifications flowed down in drawings or purchase orders take precedent over these specifications.***
    a. All communication with Qualitel Hillsboro must be directed through your respective buyer. Please don't by-pass the buyer under any circumstances. If the buyer is not available, contact the purchasing manager directly.
2. The Supplier must advise prior to production if there are any standards in this document, on the purchase order, or in customer documents that cannot be met, or which may adversely affect selling price. The Supplier should suggest alternatives in those cases where it may be a significant price factor. Such changes must be approved by Qualitel Hillsboro in writing before production shall commence.
    a. Any waivers or deviations to requirements will be clearly shown on the purchase order or written agreement. Such change requirements will be valid only for the product on the respective purchase order and will apply only to the number of boards requested on that order.
    b. The supplier must make no changes to the materials or processes used to produce the product without written notification and agreement from Qualitel Hillsboro. Should the PCB manufacturer make any such change without written approval, it will be responsible for all costs related to scrap, rework, re-qualification or other costs associated with any unauthorized change.
3. The Supplier shall inform Qualitel Hillsboro of any missing, undefined, non-functional, or erroneous data in the PCB quote package. This shall include, but is not limited to CAD, Gerber, Netlist, and/or Panelization Data.
4. Board panelization requirements are defined to meet the needs of our automated assembly equipment. Board layout, panelization, marking, etc. are generally intended to conform to typical industry standards.
    a. The preferred panel size for Qualitel Hillsboro is 5 x 8 to 8 x 11 inches. Qualitel Hillsboro length range is from 3 to 18.5 inches and the width range is 3 to 16.5 inches. The maximum dimensions are measured to the outside edge of the panel. Panel size must be stated clearly in your quote.
    b. The panel shall have a 0.30-inch minimum breakaway border around at least the two longest sides of the panel. Fiducials should be added to the panel and should be at least 0.15 inch from the outside edge of the panel. Follow the fiducial criteria noted in step 9 below. If there are components such as right-angle connectors that overhang the edge of the PCB, then the border width shall extend beyond the connector overhang. If the PCB supplier is uncertain on this point, please ask your buyer to clarify this point.

c. The PCB supplier may propose options for de-paneling boards. Acceptable options may be perforated tabs, hard tabs, v-score tabs, and v-score. Please state your proposed optimal method for handling this process on your quote. Qualitel Hillsboro defaults to a v-score process.
d. Prefer 0.1" routing between boards with parallel passive capacitor less than 0.25" from edge. If tabs are used routing of 0.1" is standard with perforations on at least PCB side. V-score down the center parallel with the long rail is not preferred.

5. All boards received shall meet Customer, Qualitel Hillsboro, and Industry specifications for acceptability. In those rare occasions where "X-Out" boards need to be shipped, the following standards must apply.
   a. X-Out is defined as a non-conforming board that is a part of a panel array of boards. It has been tested and/or inspected and found to be out of specification by the manufacturer and is marked with an "X" on both sides of the board.
   b. Panels that contain X-Out boards, if shipped, must be packaged separately and grouped by board location in the panel. They must never be mixed intermittently with panels that have no X-Outs.
   c. The number of X-Out boards must be limited and controlled by the manufacturer. The chart below defines the standard:

| # Boards Per Panel | Number of X-Outs Allowed | % of Lot with X-Outs |
|---|---|---|
| 1 to 4 | 0 | 0 |
| 5-12 | 1 | 3% |
| 13 to 24 | 2 | 4% |
| Over 24 | 3 | 5% |




6. Board and Panel Marking: All marking shall be consistent from board-to-board and lot-to-lot and shall be of contrasting color, either etched into the copper layer or marked with epoxy ink.
   a. All board images shall have a date code or lot code. If not allowed by customer design, or where not practical by size or layout, the date code or lot code shall be included on the panelization frames.
   b. All board images shall have inspection and/or test stamps to indicate acceptability. If not allowed by customer design, or where not practical by size or layout, the stamps shall be included on the panelization frames.
7. Lead free circuit boards must be made with a material of at least 150C Tg and 325C Td.
8. All board edges must be smooth and free of fibers. Boards must be clean and free of dust.
9. Fiducial size shall be 0.03 to 0.05 inches with a 0.15" clearance area. The preferred location of fiducials is on the board image. It is acceptable to place fiducials on the panelization frame. At a minimum, 2 diagonally opposed non-symmetrical fiducials are required within the panelization frame presented to the machine alignment cameras. Three non-symmetrical fiducials are preferred. Fiducial marks must be flat within 0.0006 of an inch and consist of exposed metal, not masked. PCB Testing: All testing shall be in accordance with IPC-9252, current rev. A test plan and test coverage report shall be provided to Qualitel Hillsboro prior to implementing production. Test coverage shall be 100% of all accessible pads and nodes.

Any test plan with less than 100% coverage requires written approval by Qualitel Hillsboro prior to implementing production.

10. Each shipment must be packed in a manner to minimize any risk of damage and in accordance with IPC-1601 (current rev) and J-STD-033 (current rev). Shipments must use only the mode of transportation that is referenced on the purchase order unless specifically changed by the buyer. If the printed circuit boards have a silver finish, packaged boards or panels shall be protected in silver protecting paper and shipped in moisture barrier bags without desiccant to prevent tarnish. Shipments shall include:
    a. Packing slip which references the respective purchase order number
    b. Certificate of Compliance
    c. RoHS Certification (if compliant)
    d. REACH Certification (if compliant)
    e. 2 Solder Samples for each new date code
    f. Ionic Test results
    g. First Article Report for each new board revision
    h. Indication of date codes included in the shipment
    i. Upon specific request of Qualitel Hillsboro or the end-use customer:
        i. Material Certifications, including Conflict-free Materials Certifications
        ii. AS9102 First Article Report
        iii. Solderability Test Results
        iv. Certificates of Origin
        v. Microsections and Microsection Reports
11. Rework and Repair: Rework is authorized by Qualitel Hillsboro, provided the end result meets the requirements of IPC-7711, current rev. Repair is authorized provided the end result meets the requirements of IPC-7721, current rev. Rework or repair that is not permitted under IPC-7711/7721 requires written authorization from Qualitel Hillsboro and must include the quantity of boards that are authorized for repair.
12. Documentation and Record Retention: The Supplier is responsible for storing and maintaining any and all documentation, samples and records providing evidence of conformance to requirements related to Qualitel Hillsboro product for a minimum of 11 years. Once the minimum retention period is met, the supplier is responsible to contact Qualitel Hillsboro prior to disposal for proper disposition of documented information.
13. From time to time, Qualitel Hillsboro may provide information to PCB suppliers that are confidential in nature. Disclosure of such information to others may cause harm to Qualitel Hillsboro, its customers, or others. Drawings, Gerber Files, design information, volumes, end application data, sample boards, and final customer name are examples of things that could cause harm if confidences are breached. PCB supplier must use its best efforts to hold all information securely so that confidential data will never be disclosed. Acceptance of such information as a quote request or purchase order provides implied agreement that PCB supplier will hold such disclosed information confidential.
14. PCB supplier is assumed to be an expert in all aspects of circuit board production and shall not use this specification as a basis for providing products that is below normal standards of production in any manner. Qualitel Hillsboro is dependent upon PCB supplier to deliver circuit boards according to the committed date, at the committed price, and subject to all conditions listed above. Failure to do so may cause irreparable harm to Qualitel Hillsboro.