Global Printed Circuit Board Procurement Specification

Global Printed Circuit Board Procurement Specification

Note: Clauses with "+++" are commitments to regulatory findings and **must be followed** to prevent reoccurring issues

1.0 PURPOSE

This specification describes the manufacturing and quality requirements for bare printed circuit boards procured by Creation Technologies. Acceptance of Creation Purchase Order constitutes acceptance of these requirements. Any deviation from these specifications must be obtained in writing prior to manufacture. Specification applies to new designs or new revisions only.

2.0 SCOPE

Any deviation to this specification, without written approval from Creation Technologies, are prohibited. Specific purchase order requirements may deviate from this specification. These deviations apply to the particular purchase order, and do not constitute an amendment to this specification. All other elements of this specification are supplemental to purchase order requirements.

NOTE: Unless otherwise specified; the deviation(s), when granted, are issued on a case-by-case basis for each individual date code and are not transferable to other boards, products, or date codes without written approval from Creation Engineering. In addition, Creation requests that every deviation request file be named according to the "PO # / Part #" for ease of filing.

1. Unless otherwise documented on purchase order and/or defined in documentation found in section 7.1 Order of Precedence, bare printed circuit boards procured by Creation Technologies will be fabricated in accordance with Global Printed Circuit Board Procurement Specification #C-0002134 (This document) and/or acceptability requirements of IPC-A-600 Class 2, in conjunction with IPC-6012 Class 2 or IPC-6013 Class 2, whichever is more stringent. Standards revision in effect are based at the time of purchase order issue.
    a. Rigid Printed Circuit Boards shall be fabricated to meet IPC-6012, Qualification and Performance Specification for Rigid Printed Circuit Boards and the requirements found in section **7.1 Order of Precedence**.

Rigid-Flex and Flex Printed Circuit Boards shall be fabricated to meet IPC-6013, Qualification and Performance Specification for Rigid-Flex and Flex Printed Circuit Boards and the requirements found in section **7.1 Order of Precedence**

3.0 DEFINITIONS

TERM	DEFINITION
AQL	Acceptable Quality Limit (Ref: ANSI/ASQ Z1.4 / Z1.9)
CGD:	CONTROLLED GOODS DIRECTORATE (CANADA)
ITAR:	INTERNATIONAL TRAFFIC IN ARMS REGULATIONS
IPC:	Institute of Printed Circuits
PO:	Purchase Order including attached Fabrication Data, files & drawings
SUPPLIER:	Supplier of Printed Circuit Boards to Creation Technologies
UL:	Underwriters Laboratories Inc.

4.0 FUNCTIONS RESPONSIBLE FOR THIS PROCEDURE/ROLES

The functions listed below have responsibilities detailed in this procedure:

- **Process Owner:** Engineering Leader
- **Procedure User:**
  - Procedure Owner: The Engineering shall be responsible for updates as needed to this document.
  - Commodity Management, Corporate PCB Commodity Manager: is Accountable - who must sign off (Approve) on work before it is effective.
  - Quality Leaders and Materials: to be Consulted - has information and/or capability necessary to complete the work.
  - Supply Chain and Supplier Quality: to be Supportive - shall provide resources and play a supporting role in implementation to suppliers.
  - Quality Leaders and Engineering Leadership: to be Informed - must be notified of results but need not be consulted.
  - Creation procurement team, quality engineers and engineering team: will review SOP and acknowledge in Creation University (or equivalent).
- **Contributors:**
  - N/A

5.0 TRAINING

Course Code: COM_ENG_0016

The process owner and document author are considered trained by default because of their contribution in writing and reviewing/approving the document.

Procedure users must be trained on the major revisions of this procedure before executing their task.

Contributors do not require formal training, but the procedure users are responsible for informing the contributor of their requirement when they are engaged in their contribution

5.1 SUPPLIER

1. Suppliers will receive a copy as part of the onboarding process.
2. Supplier shall be responsible for obtaining all supporting documentation, including but not limited to, customer specification and fabrication information.
3. Supplier shall inform Creation Technologies of any discrepancy between, Purchase Order, Customer documentation (including master artwork, fabrication documentation and specification), and Creation documentation (including array drawing, fabrication documentation and specification).
4. Suppliers manufacturing bare printed circuit boards identified as International Traffic in Arms Regulations (ITAR) or Canadian Good Controlled Good Directorate (CGD) must provide Creation Technologies with current registration documentation. Creation Technologies shall be informed of any changes to Supplier status.
5. Documentation and data transmitted by Creation Technologies shall not be disclosed to third party without prior written approval. All information is considered proprietary.
6. Supplier shall be responsible for providing Creation Technologies any & all proposed quality level processes and procedures upon request. Supplier may use IPC AQL standards, or Supplier's internally developed and proven process standards. If Supplier opts to use internally developed processes, Supplier must have such standards & processes revision controlled.

Supplier must provide Creation Technologies with a copy of the testing standards used and have data available upon request. Supplier must keep a hard copy of these standards on file, available for review during any on-site audit and be able to produce if customer requested.

7. For Suppliers, acceptance of PO indicated acknowledgement and compliance to Creation Technologies' Supplier quality requirements.
8. Failure to comply with this document may result in rejection of the supplied material at the supplier's expense (including the labor and material charges of the processed boards) and removal of the supplier from Creation's Approved Vendor List (AVL).

6.0 EQUIPMENT, MATERIAL, SUPPLIES

6.1 Access to:

6.1.1 Email

6.1.2 Specifications and

6.1.3 certifications

7.0 PROCEDURE

7.1 ORDER OF PRECEDENCE

Acceptance criteria and flow down order of precedence for documentation and fabrication shall apply as follows:

#	DESCRIPTION
1	Creation Technologies Purchase Order. Creation Technologies individual business units (Process Engineering, Product Cost Engineering) may define business unit specific requirements. In these cases, the business unit requirements shall be documented on the purchase order and shall supersede as noted.
2	Procurement documentation (including Customer Fabrication Drawing & Customer Master Artwork), this includes Creation Technologies and end customer engineering question resolution, readme files, and Array Drawing for Creation Technologies internal use.
3	End Customer Specifications. Creation will flow down the customer specification documents
4	Creation Technologies, Printed Circuit Board Procurement Specification (*this document*). *For purchase orders placed prior to 1-Jul-2024, in case of a conflict, Creation Site Printed Circuit Board Procurement Specification will supersede this document.* *For PCBs with existing tooling, no change is required until an Up-Rev rolls out.*
5	All applicable IPC Standards.

7.2 REGULATORY REQUIREMENTS

#	DESCRIPTION
1	The PCB supplier and all materials used in the finished PCB must be listed by Underwriters Laboratories Inc. as WIRING, PRINTED (ZPMV2) and comply with UL796 with flammability ratings of UL 94.
2	Finished PCB's must have a minimum UL listed flammability rating of 94V-0, unless specified.
3	The supplier shall include on all circuit boards, using suitable indelible markings, their logo, date code and UL Flammability rating (or UL registered company identification signifying board has a UL 94V-0 minimum flammability rating).
4	The supplier shall provide Creation with their UL file number and associated recognized markings upon request.

7.3 PRODUCT REQUIREMENTS

7.3.1 Manufacturing & Artwork Changes

#	DESCRIPTION
1	The artwork patterns must be in accordance with supplied artwork files: 1. Any modifications to design for manufacturing purposes must not affect the functionality of the part. 2. Any modifications other than compensation for manufacturing process allowances must be submitted to Creation Technologies for approval. 3. If requested, check plots of the loaded Gerber files shall be forwarded to Creation Technologies for Approval.
2	The supplier is responsible for any modification to Gerber files for any reason: 1. In the event modification occurs, Supplier shall compare modifications to original customer data, and compare net list with original data. 2. Any modifications shall be submitted to Creation Technologies for approval with supporting comparison, including netlist. 3. Modifications include but are not limited to; array modifications, production arrayl changes, and data manipulation outside of standard manufacturing process allowance (a standard change example would be, etch compensation).
3	If the Supplier creates or modifies the panel array, supplier shall provide to Creation Technologies a panel drawing showing all dimensions, fiducials, and tooling hole locations.
4	No changes to the manufacturing process, process chemistry, or to the materials used, shall be made without the prior written approval of Creation Technologies.

5	No change to the manufacturing facility or location is to be made without the prior approval of Creation Technologies, including all outsourced or sub-contracted processes.

7.3.2 Laminates

#	DESCRIPTION
1	Unless otherwise specified in fabrication data, Base material must comply with IPC-4101 (latest revision) /99 or /124 minimum for all RoHS compliance conditions.
2	Raw Material to be suitable for high temperature lead-free processing.
3	The manufacturer and type of materials shall not be changed without prior written approval from Creation Technologies.

7.3.3 **Copper Plating Requirements**

#	DESCRIPTION
1	All plating requirements must meet IPC-A-600 Class 2, and applicable IPC-6012 OR IPC-6013 unless otherwise specified in procurement documentation.
2	Surface conductors must have copper plating in addition to base copper sufficient to meet the specified finished copper weight requirements. Holes can be metallized through electroless copper or direct metallization, with the exception of graphite-based systems.
3	Plating thieving is acceptable within the array rails and frames if the area is copper and covered with solder mask: 1. There shall be no additional thieving pattern in the PCB pattern without prior written authorization from Creation Technologies and end customer. 2. Thieving pattern in array rails and frame must be a minimum of 0.300” from any fiducial or feature and covered with solder mask.

7.3.4 Solder Mask

#	DESCRIPTION
1	Solder mask must be applied over bare copper (SMOBC) accordance with IPC SM-840.
2	**Adhesion:** • No peeling, flaking, or blistering of the solder mask is allowed upon visual inspection or IPC tape testing (IPC Test Method IPC-TM-650 2.4.1).

3	**Mask color & finish:** • If not specified, color green with a Matte or Semi-gloss finish. • Matte finish is preferred. Semi-gloss finish is the shiniest gloss accepted. • Solder Mask shall withstand assembly and batch wash processes and be compatible with no clean flux, water soluble flux, and rosin-based flux.

7.3.5 Surface Finish

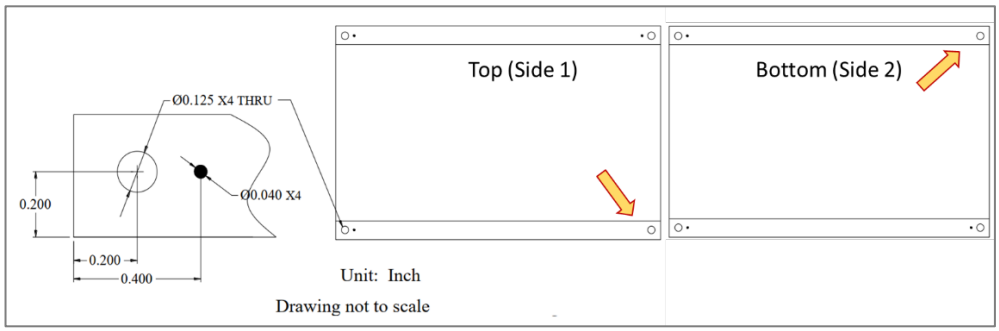
#	DESCRIPTION
1	**Tin-Lead (63/37) HASL:** • The tin-lead solder coating must be HASL finish, solder fusing is not allowed. • Pads must exhibit good wetting and be 100% covered with no evidence of residual solder mask, silkscreen or exposed copper. • No component holes may be plugged with tin-lead solder or reduced below minimum size requirements.
2	**Lead-Free HASL:** • The lead-free solder coating must be HASL finish, solder fusing is not allowed. • Pads must exhibit good wetting and be 100% covered with no evidence of residual solder mask, silkscreen or exposed copper. • No component holes may be plugged with lead-free solder or reduced below minimum size requirements.
3	**Electroless Nickel Immersion Gold (ENIG):** • Unless otherwise specified, refer to latest revision of IPC-4552 Specification for Electroless Nickel/Immersion Gold (ENIG) Plating for Printed Circuit Boards. • In addition, no individual measurement of gold thickness below 2 micro-inches is allowed, and no individual measurement of Electroless nickel below 120 micro-inches is allowed.
4	**Immersion Silver:** • Unless otherwise specified, refer to latest revision of IPC-4553 Specification for Immersion Silver Plating for Printed Circuit Boards – Thick Silver. • In addition, no individual measurement of silver thickness below 5 micro-inches is allowed. • Maximum thickness of 16 micro-inches
5	**Immersion Tin:** • The immersion tin surface plating must meet latest revision of IPC-4554 Specification for Immersion Tin Plating for Printed Circuit Boards and must have a minimum thickness of 40 micro-inches of tin.

6	**Organic Solderability Preservative:** • The use of any OSP finish other than Enthone Entek Plus HT must be approved in advance by Creation Technologies.

7.3.6 Dimensional

#	DESCRIPTION
1	**Thickness:** • For PCB greater or equal to .062", finished board thickness must be within ± 10% of the indicated nominal, or .010"max (whichever is less) as measured on SMOBC. • For PCB less than .062", finished board thickness must be ± .005 of the indicated nominal as measured on SMOBC.
2	**Overall dimensions:** • All routed board dimensions must be within ± 0.005" of the nominal relative to datum. • This includes board edges, cut-outs, notches, and slots. Scoring +/- .007"
3	**Flatness:** • Bow and Twist of finished PCBs must not exceed 0.75%, as determined by IPC bow and twisttesting (IPC Test Method IPC-TM-650 2.4.22).

7.3.7 Fiducial Marking

#	DESCRIPTION
1	*Unless specified otherwise*, the panel array breakaway tabs should have fiducial markings (.040" dia), with mask clearance twice the fiducial diameter, one near each of 3 corners. Each side, typically called top and bottom side to have different pattern of Fiducials on 3 Corners. 

7.3.8 Solderability

#	DESCRIPTION
1	All PCBs shall meet the solderability requirements of IPC-J-STD-003 (method per TDP/Specs or AABUS) at the time of shipment receipt.

7.3.9 Bare Board Electrical Testing

#	DESCRIPTION
1	100% bare PCBs testing is required (unless otherwise specified on procurement documentation): 1. Refer to IPC-9252 Guidelines and Requirements for Electrical Testing of Unpopulated Printed Boards. 2. All compliant boards must be stamped or marked with indelible ink on the board, in an area clear of text and features. 3. If there is no available space on the board, pallet rails or frames can be used.
2	**Impedance Testing:** • When required, Impedance Testing shall be conducted per lot date code on TDR coupon or Printed Circuit Board and shall be traceable to lot. • Unless otherwise specified, Impedance tolerance shall be +/- 10%.

7.3.10 Repair and Rework

#	DESCRIPTION
1	No defects repaired by welding are allowed.
2	Extraneous copper may be mechanically removed as long as base laminate is not damaged, trace width & spacing requirements are maintained, and the area is touched-up with solder mask and meets the standards of this document and IPC-A-600, Class 2.

7.3.11 X-Out Pallets

#	DESCRIPTION
1	X-Outs within the array are not allowed unless specifically stated on the purchase order or Customer/Business unit procurement documentation.
2	When X-outs are allowed on Purchase Order or Customer/Business unit procurement documentation, no more than 5 % of panel arrays of any individual part number may contain X-Outs for each shipment made. *The maximum number of X-Outs allowable per array is as follows, unless otherwise specified:* • 2 to 6 units per Array, 1 X-Out maximum • 7 or more units per Array, 2 X-Outs maximum
3	X-Out shall be marked using a permanent black or white tip marker. Both top and bottom of the X-out shall be marked. Marking shall withstand assembly and batch wash process.
4	For X-Out boards, ensure that 3 FIDs are left after blacking out the 4th FID for X-Out. a) PCB supplier to black-out one out of the four FIDs nearest to the date code marking on both sides. b) If there are not minimum 3 FIDs, submit an TQ/EQ to Creation Engineering team.

	In cases where a fiducial blackout is not feasible, an additional marking in the form of a white dot (label) applied in a predetermined location on the board.
5	For the panel array, with an X-Out board to be identified using a 'black out' mark or white-dot on the side Rail, right next to the score line or route-line (2 inches from the nearest board edge). **Note:** If the panel array design is provided by Creation customer, then rail is part of the customer design and cannot be modified. To be resolved by means of a TQ/EQs
6	When allowed, All X-Outs must be sorted, packaged separately, and clearly marked. To be **sorted** by quantity and **location** of the X-Out.

7.3.12 Ionic cleanliness

#	DESCRIPTION
1	All finished PCBs as shipped must have ionic contamination levels no greater than maximum permitted as per IPC (i.e. presently at 1.56 µg/cm^2) of sodium chloride as per IPC test Method IPC-TM-650 2.3.25; unless otherwise specified on the procurement documentation.

7.3.13 Quality Inspections

#	DESCRIPTION
1	If sampling plans are used to perform visual and dimensional part inspection, they shall be in compliance with section 5.2.6.
2	However, use of sampling plans in no way relieves the supplier of their responsibility to ship 100% conforming material.

7.3.14 Marking

#	DESCRIPTION
1	All boards shall be permanently marked or contain manufacturing date code and build, or unique serial number.
2	Unless otherwise specified, the format shall be WWYY - #, where "WW" is week, "YY" is year and "#" is the build number corresponding to the number of times the part number and revision have been fabricated by supplier or unique serial number can be used by part or Lot.

7.4 QUALITY REQUIREMENTS

#	DESCRIPTION
1	External Annual ring shall be a minimum of .001” around component hole. In the event the design attributes do not allow for .001” annual ring, supplier is to notify Creation Technologies in writing.
2	Printed Circuit Boards Surface Finish Requirements: 1. **Tin-Lead (63/37) HASL surface finish PCB** shall not be more than 6 months old per lot date code. PCB greater than 6 months old may be accepted with prior written authorization from Creation Technologies and shall include submittal of solderability test data with shipment. 2. **Lead-Free HAL surface finish PCB** shall not be more than 6 months old per lot date code. PCB greater than 6 months old may be accepted with prior written authorization from Creation Technologies and shall include submittal of solderability test data with shipment. 3. **Electroless Nickel Immersion Gold (ENIG) surface finish PCB** shall not be more than 6 months old per lot date code. PCB greater than 6 months old may be accepted with prior written authorization from Creation Technologies and shall include submittal of solderability test data with shipment. 4. **Immersion Silver surface finish PCB** shall not be more than 3 months old per lot date code. PCB greater than 3 months old may be accepted with prior written authorization from Creation Technologies and shall include submittal of solderability test data with shipment. 5. **Immersion Tin surface finish PCB** shall not be more than 3 months old per lot date code. PCB greater than 3 months old may be accepted with prior written authorization from Creation Technologies and shall include submittal of solderability test data with shipment. 6. **Organic Solderability Preservative (OSP) surface finish PCB** shall not be more than 3 months old per lot date code. PCB greater than 3 months old may be accepted with prior written authorization from Creation Technologies and shall include submittal of solderability test data with shipment.
3	For supplier manufacturing over-run (stock) Printed Circuit Board stored in a temperature and humidity-controlled environment, supplier original packaging, including desiccant and humidity indicator card (HIC) shall not exceed the following requirements per lot date code: 1. **Gold Finish:** Twelve (12) Months 2. **Hot Air Solder Level (HASL):** Twelve (12) Months 3. **Lead-Free Hot Air Level (HAL):** Twelve (12) Months 4. **Immersion Silver:** Six (6) Months 5. **Immersion Tin:** Six (6) Months 6. **OSP:** Six (6) Months No deviated shipping shall be allowed from the guidelines above.

4	**Microsection Requirements:** • Microsection evaluation shall be performed on a thermally stressed coupon or production board. The Microsection evaluation shall be evaluated in accordance with applicable IPC Class 2 standards (Unless otherwise specified) and applicable Thermal Stress Testing per IPC-TM-650, Method 2.6.8.

7.5 DOCUMENTATION AND DELIVERABLE REQUIREMENTS

7.5.1 Certificate of Compliance (“C of C”)

#	DESCRIPTION
1	All shipments shall include a Certificate of Compliance to all requirements listed on purchase order and this specification for each date code of each part. *The Certificate must include:* 1. Manufacturer Name, Address, and Contact information 2. Creation Part Number & Revision 3. Manufacturing Date Code and Build Number 4. Statement of Conformance to all Requirements and Specifications 5. Manufacturer and Type of Laminate material used 6. UL file Number 7. Quantity 8. Signature of Authorized Representative
2	If part is specified as being RoHS compliant, the Certificate of Compliance must state compliance to: • DIRECTIVE 2015/863/EU, or the most current directive.
3	If part is specified as being REACH compliant, the Certificate of Compliance must state compliance to the most current SVHC candidate list.
4	Supplier shall provide to Creation Technologies, upon request, technical documentation such as Conflict Minerals Reporting Template (CMRT) and / or Full Material Declarations.
5	Supplier shall provide to Creation Technologies, upon request, technical documentation and proof of internal production control procedures showing how compliance is ensured. This shall include all processes outsourced or subcontracted by the supplier.
6	All PCB procured through an independent procuring company, broker, or manufacturers rep. shall clearly state on the Certificate of Compliance the manufacturer’s factory name and location.

7.5.2 First Article Inspection Report

#	DESCRIPTION
1	The first shipment of each part manufactured must include a First Article Inspection Report. 1. The format of the report is at the discretion of the supplier but must demonstrate verification of all dimensions and requirements listed in purchase order documentation. 2. This shall include a Microsection of the smallest plated hole characteristics, conductive layer thickness, final surface-finish thickness, and minimum Solder mask thickness.
2	All first article builds must include 1 extra array panel array with shipment.

7.5.3 Microsection Requirements

#	DESCRIPTION
1	Unless otherwise specified, Microsection report shall be provided with each shipment.
2	Micro section report needs to be included with each shipment of any date code. Double sided PCB's require micro sections only on the first qualification build. Additional deliveries require the Micro section evaluation report only.
3	Vendor shall retain a copy of the Microsection report and potted coupon from which the Microsection was taken for a period of 7 years, unless otherwise specified on the procurement documentation.

7.5.4 Electrical Test Report

#	DESCRIPTION
1	Unless otherwise specified, Electrical Test report shall be including in the shipment.
2	The format of the report is at the discretion of the supplier but must demonstrate 100% Electrical Testing of all PCB (unless otherwise specified on procurement documentation), quantity tested, quantity pass, and test conditions including: voltage, continuity, and insulation.
3	When applicable, Impedance Test conformance certificate and/or data per lot date code shall be provided with each shipment.

7.5.5 Ionic Contamination Report

#	DESCRIPTION
1	Unless otherwise specified, Ionic Contamination Test report shall be including in the shipment.
2	The format of the report is at the discretion of the supplier but must demonstrate compliance to Ionic cleanliness found in section 7.3.12.

7.5.6 Solder Sample Requirements

#	DESCRIPTION
1	Unless otherwise specified, a solder sample board for each date code manufactured must be included with shipment, for Creation Technologies test purposes.
2	The sample must be a bare array panel, per specified PCB surface finish.
3	A reject array panel is acceptable but must be wrapped separately and clearly marked “Solder Sample”.

7.6 PACKAGING & SHIPPING

7.6.1 Shipment Deliverables

#	DESCRIPTION
1	The supplier shall include the items listed below with all shipments of boards, per date code and in a single package. The deliverables are always in box one with all box numbers labeled. All items below must be on the top of the shipping container; the shipping container must be marked on the outside as box one that the deliverable documentation is on the inside of the container. Creation has the right to request that the Shipment label format to be as per Creation labelling specification.
	Shipment Deliverables a. Packing Slip b. Certificate of Conformance c. Solderability test report d. Electrical test report e. Surface finish thickness report f. Cleanliness test reports g. If there is any special requirement (e.g.: impedance), proof of compliance is required. h. Final Inspection and Micro section report must include both VIA and component hole and must indicate material type and layer if mixed materials are used. i. FAI report, if applicable j. Electrical Test coverage report, if applicable k. Two virgin A/B coupons (per date code) for class 3 product and one solder sample or Solderability coupon. l. If required by the end customer, the PWB Fabricator, prior to manufacture, shall provide a stack up for each unique revision. m. With each shipment submit deliverable check off sheet as a cover letter to your documentation package. Creation may request an advance copy to be delivered electronically.

7.6.2 Internal Packaging

#	DESCRIPTION
1	All Suppliers must comply with the handling and packaging guidelines of IPC-1602 Latest Revision.
2	All immersion silver and other similar finishes at risk of tarnishing, will have ONLY a top and bottom of the appropriate sulfur-free slip sheet material, and vacuum sealed Moisture Barrier Bag (MBB): 1. Each package must contain Sulphur-free desiccant placed along the edge of the boards. 2. Each package must contain a Humidity Indicator Card (HIC) to ensure humidity exposure remains below 50%. 3. Creation reserves the right to reject any package received with seal broken and/or humidity indicator showing >50% relative humidity exposure.
3	When boards contain break away edge rails or frames, the corners should be radiused (up to .020”) to help better maintain the integrity of the bag during shipping.
4	All parts must be packaged and placed in boxes using industry acceptable methods with sufficient materials to prevent damage or shifting during shipment. All packing materials used must be anti-static.
5	When allowed, All X-Outs must be sorted, packaged separately, and clearly marked. To be **sorted** by quantity and **location** of the X-Out.

7.6.3 External Packaging

#	DESCRIPTION
1	All parts must be placed in boxes with sufficient materials to prevent shifting or damage during shipment.
2	Boxes must be of adequate strength to prevent damage and be labeled as fragile & which direction up.
3	All packing materials used must be anti-static.
4	Each package must be labeled with Ship to Address, Creation Technologies Purchase order and part number, revision number, and quantity within box: 1. If multiple boxes are required for shipment, each box shall be numbered relative to total number of boxes. 2. The box containing all shipping and quality documentation must be clearly identified.

7.6.4 Shipping box

#	DESCRIPTION
1	Shipping box shall not exceed 30 Pounds (LBS).

7.7 Monitoring

N/A

8.0 RISKS, OPPORTUNITIES, AND SAFETY

8.1 Risk

- If this procedure is not followed it could have an impact on:
  - Supplier Partners and Creation Technologies may fail to align on and understand key performance measurements and metrics which may negatively impact Creation Technologies' ability to support the end customer.
  - Excessive scrap
  - Poor solderability
  - Soldermask failures
  - Final manufacturing test failures
  - End Customer product failures

8.2 Opportunities

- N/A

8.3 Environmental Health & Safety

- N/A

9.0 EXCEPTION AND DEVIATION

Conditions Allowed	Action Required
N/A	N/A

10.0 REFERENCED DOCUMENTS

Parent Document: C-0002292 Supply Chain Management

10.1 Standard and Regulatory Requirements

Standard/Regulation #	Clause/Sub Part # (Optional)	Document Name
ISO 9001		Quality Management System
ISO 13485		Quality Management System – Medical Devices
21 CFR 820		Quality System Regulation – Medical Devices
J-STD-003		Solderability Test for Printed Boards
IPC-T-50		Terms and Definitions for Interconnecting and Packaging Electronic Circuits
IPC-6011		Generic Performance Specification for Printed Boards

IPC-6012		Qualification and Performance Specification for Rigid Printed Boards
IPC-6013		Qualification and Performance Specification for Rigid-Flex and Flex Printed Circuit Boards
IPC-6016		Qualification and Performance Specification for High Density Interconnect (HDI) Layers and Boards
IPC-A-600		Acceptability of Printed Boards
IPC-4101		Laminate/Prepreg Materials Standards for Printed Boards
IPC-4552		Specification for Electroless Nickel/Immersion Gold (ENIG) Plating for Printed Circuit Boards
IPC-4554		Specification for Immersion Tin Plating for Printed Circuit Boards
IPC-SM-840		Qualification and Performance of Permanent Polymer Coating (Solder Mask) for Printed Boards
IPC-TM-650		Test Methods Manual
IPC-D-5612		Printed Board Dimensions and Tolerance
IPC-1602		Printed Board Handling and Storage Guidelines
IPC-1066		Marking, Symbols, and Labels for Identification of Lead-Free
IPC-9252		Guidelines and Requirements for Electrical Testing of Unpopulated Printed Boards

10.2 Related Documents

Document #	Document Name
C-0002890	Supplier Quality Requirements – Creation Technologies
C-0002622	Create and Manage Purchase Orders

11.0 KEYWORDS

Global Printed Circuit Boardo;Procurement Specification Procedureo;PCB Procurement

Global Printed Circuit Board Procurement Specification

APPROVALS

See DocBank workflow approval

HISTORY OF CHANGES

Revision	Authored/ Revised by	Section # Changed	Summary of Changes	Reason for Change	Effective Date (YYYY-MM-DD)
C	Farid Anani	1.0 + Various	• Added note to section 1.0 “Spec applies to new designs or new revisions” Changed term “Panel” to “Panel Array” for clarity in multiple sections.	Updated based on internal & vendor feedback and for additional clarification.	2026-01-02
		4.0	Updated RASCI		
		5.2	• Supplier may use IPC AQL standards, or Supplier’s internally developed and proven process standards.		
		7.1	• Effectiveness date.		
		7.2	• #2, updated 94V-0		
		7.3.7	• Further clarified fiducial marking.		
		7.3.11	• #2 corrected verbiage to 7 or more per array.		
		7.3.11	• #3 accepting both black or white tip marker.		
		7.3.12	• Updated ionic cleanliness level.		
		7.5.3	• Updated Microsection Requirements.		
		7.5.5	• #2 updated reference to appropriate cleanliness section.		
		7.6.1	• Removed requirement to ship microsections with first shipment of every code. A site may specify this requirement as required.		
		7.6.2	• Simplified packaging requirements per IPC-1602 only.		
B	Saad Ahmed	7.3.9	• Changed X-out color mark from Black to White. • Added requirements for marking boards with X-outs as well as arrays containing X-out boards. 1.0 *Additional changes to be added.*	Changed as per feedback received from BUs and their challenges in managing X-Outs boards being received from suppliers.	2023-08-21
A	Ryan Campbell	Section 3, 7.1.5, 4.2, 7.6.1.3	• Document# C-0002134 title header changed to “Global Printed Circuit Board Procurement Specification”.	General Improvements and updates	2020-11-18

Global Printed Circuit Board Procurement Specification

Revision	Authored/ Revised by	Section # Changed	Summary of Changes	Reason for Change	Effective Date (YYYY-MM-DD)
			• Reformatted according to latest SOP template sections (C-0000128- RevD) • Section 3 – Updated to include ITAR & CGD definitions • 7.1.5 Changed any to All applicable IPC Standards (was 5.5) • 4.2 changed to allow PCB suppliers to use either IPC AQL standards OR suppliers internally developed and proven process standards. (was 7.1.5) • 7.6.1.3 changed “the corners can be radiused” to SHOULD be radiused (was 11.1.2)		
0	Derek Schurman	N/A	Initial release of the document into Document Bank Database with new document number. Legacy document # 0-0430-0325 Rev0	Initial Release into DocBank	2017-11-08