

REVISION HISTORY

<u>REV</u>	<u>DATE</u>	<u>ORIGIN</u>	<u>REASON FOR CHANGE(S)</u>
A	06Jun16	Norbert Suta	New
B	29Sep16	Eric Steif	Added clarification language to COC requirements
C	5/04/18	Daniel Crouse	Added PCN language
D	11Oct18	Daniel Crouse	Added cross section for ENIG boards for hyper-corrosion check per IPC 4552, section 3.6.1.2
E	30Oct18	Joyce Conn	Revised hyper-corrosion requirement

Q-CODE Q22B QUALITY REQUIREMENTS

The following are the quality requirements for product purchased under Q-code Q22B. Please reference the [Plexus Supplier Quality Manual DCS # 10503](#) for additional details. Unless a written waiver is received from Plexus, the supplier agrees to abide by the quality requirements listed below.

1st Shipment - The documentation and quality requirements for the 1st shipment are as follows:

- A. First Article Inspection Report – 100% inspection report including as minimum:
 - i. All dimensions and specifications on drawing must be verified and within print tolerance. Plexus must approve any dimension that is not within print specification in writing before product can be shipped.
 - ii. Boards edges
 - iii. Holes and plated through holes
 - iv. Printed contacts
 - v. Thickness of metallic coating
 - vi. Holes diameters
 - vii. Bow & Twist
 - viii. Peel Strength
 - ix. Solder mask characteristics
- B. Cross-Section (with inspection data) per IPC-6012 section 3.6.2
- C. Hyper-corrosion – For ENIG boards, process controls shall be implemented as per Plexus PCB specification G9000-3. Results and applicable cross-sections shall be retained by the supplier and provided to Plexus on request.
- D. PCB for Solderability Sample - Complete and physically intact PCB or Array as supplied for the Part Number. This should be segregated and boldly identified. The box containing the solderability sample must also be identified as such.
- E. 100% Electrical Testing Certificate or Stamp. Including an Impedance Report on impedance designs.
- F. Certificate of Compliance – Must include a statement of overall compliance to all the applicable specifications (statement is not required to list, but shall cover all the applicable specifications such as; drawing, PO, customer specifications, Plexus G9000-3, IPC specification, hyper-corrosion acceptability, etc).The statement of compliance **must also** include the name and location of the facility that manufactured the Printed Circuit Board.

- G. All cartons, packing slips, reports and certificates must have Plexus part number, EC level or revision, quantity and P.O. number listed on them.
- H. Base Material Certificate
- I. Process flow chart
- J. Control Plan
- K. Full ion chromatography result required on every batch. The limits below for individual elements in annex cannot be exceeded.
The extraction method to be used is C3 Foresite testing at 3 locations. The extracted liquid measured less than 250 uA@ 120 seconds
Static Rose / Modified Rose not allowed.
- L. Certificate that the daily cleanliness audit testing required done for ionic contamination at minimum every four hours or once per production build if less than eight hours. Reference values as annex 1 below

Subsequent Shipments - The documentation and quality requirements for all subsequent shipments will be as follows:

- A. Cross-Section (with inspection data) per IPC-6012 section 3.6.2
- B. Hyper-corrosion – For ENIG boards, process controls shall be implemented as per Plexus PCB specification G9000-3. Results and applicable cross-sections shall be retained by the supplier and provided to Plexus on request.
- C. Contamination Test Report
- D. 100% Electrical Testing Certificate or Stamp - Including an Impedance Report on impedance designs.
- E. Certificate of Compliance – Must include a statement of overall compliance to all the applicable specifications (statement is not required to list, but shall cover all the applicable specifications such as; drawing, PO, customer specifications, Plexus G9000-3, IPC specification, hyper-corrosion acceptability, etc).The statement of compliance **must also** include the name and location of the facility that manufactured the Printed Circuit Board.
- F. A Solderability Sample as defined in D when a revision is made that affects the physical shape or the outerlayer artwork.
- G. All cartons, packing slips, reports and certificates must have Plexus part number, EC level or revision, quantity and P.O. number listed on them.
- H. Full ion chromatography result required on every batch. The limits below for individual elements in annex cannot be exceeded.
The extraction method to be used is C3 Foresight testing at 3 locations. The extracted liquid measured less than 250 uA@ 120 seconds
Static Rose / Modified Rose not allowed

The above listed documentation must be submitted with each shipment. Any shipment received without this documentation will be considered defective.

Product change notification

Upon acceptance of conforming product, documentation, and the requirements of this Q-code, the supplier's manufacturing process shall be considered "qualified". All changes require written approval



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from Plexus prior to implementation. Product or Process change notification requests (PCNs) shall be submitted to pcns@plexus.com.

Annex 1:

Ionic Chromatography measures the amount of ionic contamination that is present on the surface of the printed circuit board. Ionic contamination concerns Plexus due to the relationship between high contamination levels and failure of the printed circuit board due to electro-migration. This annex defines the data collection procedure, the recommend method of analysis, the specification limits of each ion of concern During qualifying a new PCB Manufacturer or a process/material change the C3 sample is recommend to be sent for Ionic Chromatography testing to understand potential cause of test result.

Referenced methodologies:

- The static ROSE method is fully described in IPC-TM-650 2.3.25 and 2.3.25.1.
- Localized extraction at three (3) locations or less, for Ionic Chromatography can be performed using the C3 tester equipment as per Foresite C3 operation manual to secure test solution. Test solution to be process per Ionic Chromatography test procedure as defined per IPC-TM-650 2.3.28.
- C3 Specification Limits: Localized extraction will be performed using the C3 tester equipment as per Foresite C3 operation manual. C3 current leakage must not exceed the normal standard reliability of 120 seconds at 250uA of leakage current.

Table 1. Ionic Chromatography limits

Contaminants		PCB (µg/in ²)
Sodium	Na ⁺	<3
Potassium	K ⁺	<3
Calcium	Ca ⁺²	<1
Magnesium	Mg ⁺²	<0.5
Ammonium	NH ₄ ⁺	<2
Acetate	CH ₃ CO O ⁻	<2.5
Formate	HCOO ⁻	<2.5
Bromide	Br ⁻	<3
Chloride	Cl ⁻	<2.5
Fluoride	F ⁻	<0.5
Nitrate	NO ₃ ⁻	<2
Nitrite	NO ₂ ⁻	<2
Lithium	Li	<0.5
Sulfates	SO ₄ ⁻²	<3
Citrate		<0.5
Phosphate	PO ₄ ⁻³	<2
WOA	WOA - SMT	N/A
	WOA- WAVE	N/A

Table 2: Static Rose (Omegameter) levels must not exceed the following levels:

Contaminants		Bare Board (µg/in ²)
Sodium Chloride	NaCl	<5

*Notice: This document is considered "UNCONTROLLED" when it exists in any printed form.
 See the Partner - Supplier section of the Plexus Web page for the current master of this Q-code.
<http://www.plexus.com>