

Supplier Quality Manual

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Plexus Introduction

This manual is provided to clarify and assure the requirements of our business relationship are clearly stated and understood. Please review all of the information and links included in this handbook. We look forward to building a positive partnership with you!

Plexus (Nasdaq: PLXS) partners with companies to create the products that build a better world. Since 1979, Plexus has been partnering with companies to transform concepts into branded products and deliver them to the market. From idea to aftermarket and everywhere in between, Plexus is a global leader in providing product Design and Development, Supply Chain Solutions, New Product Introduction, Manufacturing, and Aftermarket Services.

We specialize in working in industries with highly complex products and demanding regulatory environments. Plexus has customer partnerships in the Healthcare and Life Sciences, Industrial and Commercial, Communications, and Aerospace and Defense market sectors. We leverage our expertise to understand the unique needs of our customers' markets and have aligned our processes to provide flexibility, create efficiency and deliver superior quality.

Social Responsibility & Supplier Code of Conduct

At Plexus, we take our responsibilities to employees, shareholders and communities seriously. From our executive management team to our associates at all levels, we strive to conduct our business worldwide in a socially responsible and ethical manner. In part, this is demonstrated through our membership in the Responsible Business Alliance (RBA), formerly known as the Electronics Industry Citizenship Coalition (EICC). The RBA is an organization of electronics companies who share a commitment to ensure working conditions in the electronics supply chain are safe, that workers are treated with respect and dignity, and that business operations are environmentally responsible.

We view our suppliers as a direct extension of our company. Our success hinges on strong, positive relationships and a shared approach to responsible business practices across the supply chain. Plexus extends its expectations of its business partners through the Plexus Supplier Code of Conduct. Adherence to the contents of this document is required in order to maintain a business relationship with Plexus. It is through these responsible business practices that we foster positive outcomes for our customers, shareholders and the communities in which we do business.

Suppliers are expected to comply with the Plexus Supplier Code of Conduct available at the link below.

[Partners / Suppliers / Supplier Code of Conduct](#)

More information regarding the RBA, including training materials, can be found at the following link:

<https://www.sedexglobal.com/rba/>

Contract Review

All suppliers are expected to execute a robust contract review process of each Plexus Purchase Order (PO) and any associated requirements. The ability to comply with these specific requirements must be determined. In particular, messaging on a PO is often used to flow down requirements to suppliers. These may include Quality requirements, Environmental requirements, unique Customer requirements and Agency requirements, and Plexus PO terms and conditions. Details of many requirements are available on the Supplier page within the Plexus web page, www.plexus.com and following: [Partners / Suppliers](#). Carefully note that Quality requirements or other flowdown requirements may change periodically, therefore suppliers are reminded to verify these requirements on each PO received. Below is an example of a PO, showing several of the different areas in which requirements may print.



PURCHASE ORDER

Print Date: 11-Mar-2014 Page: 2 of 2
Purchase Order Date: 11-Mar-2014
Purchase Order Number: 340-3743099-0P
Revision: 0
Branch/Plant: 403

Do not duplicate this Purchase Order!

The following requirements must be met for all shipments:

- a) The complete Plexus Purchase Order Number and Line Number must appear on all invoices, packing list, bills of lading, labels, and correspondence.
- b) The part number, revision, Manufacturer, manufacturer's part number, and quantity must be on the packing list and packaging. The parts must match the PO exactly.
- c) All requirements of the Q-code assigned to the part number. https://www17.plexus.com/extranet/file_storage/qcindex.html
- d) Any marking on the product or packaging must be legible.
- e) The product and packaging shall contain no physical damage and must be appropriately handled and protected from ESD. The packaging must properly protect the item and prevent damage which could occur with the planned shipping method. In addition a shipment of any product sensitive to ESD below 100V HBM per ESD S20.20 must include a notification to the Plexus buyer and be clearly labeled as such on the packaging.
- f) Non Hermetic Solid State Surface Mount Devices must be defined for moisture sensitivity per IPC/JEDEC J STD-020, packaged in accordance with IPC/JEDEC J-STD-033 and labeled appropriately per EIA JEP 113.
- g) Hazardous material such as solvents, and chemicals and batteries must be properly labeled.
- h) Country of Origin Certification. Upon Purchaser's request, supplier will provide the Purchaser with the appropriate Certificate of Origin within 24 hours. The CoO will state the country of origin for the products being purchased, sufficient to satisfy the requirements of the customs authorities of the country of receipt and any applicable export licensing regulation, including those of the United States. If the country of origin is a NAFTA country, customs form 434 is required to be used. A copy of this form can be downloaded at http://forms.cbp.gov/pdf/CBP_Form_434.pdf. If the country of origin is not a NAFTA country, complete a letter, using company letterhead, certifying the country of origin of the parts being supplied.
- i) Plexus standard terms and conditions apply to this Purchase Order. To receive a copy of our standard terms and conditions please contact the Purchasing Agent or use the following web link: https://www17.plexus.com/extranet/file_storage/landocs.htm
- j) Shipments must dock at Plexus no more than 3 calendar days before the Plexus Request Date through the Supplier's Commit Date to be considered "On-Time."
- k) Plexus must be notified of all product discontinuance and Process/Product/Service changes. Plexus must receive all Product Discontinuance Notifications (EOL or Obsolescence) a minimum of 6 months prior to the last time buy date. Plexus must receive all Product/Process/Service Change Notifications (PCN) a minimum of 90 days prior to the proposed first ship date of the product. Send notice to PCNS@plexus.com. Notification processes shall follow JEDEC standards JESD48 and JESD46 at the current revision, as well as other applicable regulations and standards for all products.
- l) A special date restriction may exist for a part(s) on this PO, the restriction will be listed in the revision field on each PO line with the following format DC** YYYW: DC = date code, ** = GT, LT or NE for greater than, less than or equal, YY= year and WW = week.
- m) Counterfeit Parts Prevention and Export Compliance requirements apply to this Purchase Order. To receive a copy of these requirements please contact the Purchasing Agent or use the following web link: https://www17.plexus.com/extranet/file_storage/landocs.htm
- n) We expect our suppliers to comply with the Plexus Supplier Code of Conduct and Business Ethics available at the following web link: https://www17.plexus.com/extranet/file_storage/suppliercodeofconduct.pdf
- o) Product must be free from debris and foreign objects and be visually clean. The supplier must have processes in place to provide evidence upon request to assure that delivery of product to this Purchase Order meet this requirement.
- p) The current shipping instructions and routing information is located at the following link https://www17.plexus.com/extranet/file_storage/logistics.htm. We expect all suppliers to adhere to our shipping and routing instructions, international requirements, and to complete all necessary forms listed on this site.
- q) Acceptance of a Plexus Purchase Order (PO) constitutes acknowledgement that the Supplier has read, understands, and will comply with the expectations of the Plexus Supplier Quality Manual. The Plexus Supplier Quality Manual can be found at the following web address: <http://www.plexus.com> > Partners > Suppliers > Supplier Quality Handbook or <https://www17.plexus.com/extranet/file_storage/10503%20Supplier%20Quality%20Manual.pdf>

Equal Employment Opportunity / Affirmative Action Requirements

Supplier agrees to abide by the requirements of 41 CFR §§ 60-1.4(a), 60-300.5(a) and 60-741.5(a). These regulations prohibit discrimination against qualified individuals based on their status as protected veterans or individuals with disabilities, and prohibit discrimination against all individuals based on their race, color, religion, sex, sexual orientation, gender identity or national origin. Moreover, these regulations require that covered prime contractors and subcontractors take affirmative action to employ and advance in employment individuals without regard to race, color, religion, sex, sexual orientation, gender identity, national origin, protected veteran status or disability.

Insurance Requirements

Supplier agrees to carry general liability insurance (including products and completed operations coverage) with a minimum limit of \$1,000,000 per occurrence; general aggregate coverage with a minimum limit of \$2,000,000; product and completed operations aggregate coverage with a minimum limit of \$2,000,000; and an umbrella liability policy with minimum limits of \$5,000,000 per occurrence and \$5,000,000 in aggregate.

If Supplier is a non-U.S. company and Supplier's policy amounts are in a currency other than U.S. Dollars, Supplier's insurance limits shall be and remain equivalent to the amounts stated above. Supplier acknowledges that all of the coverage stated above will remain in place for as long as Supplier sells products to Plexus and for two (2) years thereafter. In addition, as it relates to Supplier's products liability coverage, such coverage shall be on a worldwide coverage territory. Within fifteen (15) days after Plexus' request, Supplier will provide a valid and current certificate of insurance to Plexus that names Plexus as an additional insured for liabilities arising out of operations and products of Supplier. In the event of termination or cancellation of any coverage identified above, Supplier, its insurance agency, or its insurance carrier will provide Plexus thirty (30) days' prior written notice of the intent to terminate or cancel such coverage.

Eco Compliance Requirements

Suppliers must provide compliance documentation at a level that meets the expectations of various material legislative requirements. Certificates of conformance may not always be the accepted level. Many times compliance with expectations will mean completing an information request in the format that is provided by Plexus and/or the customers of Plexus. It is strongly encouraged to provide full material disclosures to ease the burden of repeated requests for a specific product.

REACH (Registration, Evaluation and Authorization of Chemicals)

All suppliers must read and respond regarding REACH by going to the Plexus website: www.plexus.com, following [Partners / Suppliers / Plexus Environmental Specifications](#), REACH Specification 7168 - Supplier Specification for supplying REACH information. Complete and forward the form to eco.compliance@plexus.com.

Confidentiality

Just as we respect and protect confidential information provided by our suppliers and customers, we expect the same dedication regarding confidential information we may provide to you. The releasing of pricing, scheduling or any other data concerning the items we purchase from our suppliers is strictly prohibited unless specifically allowed by the Plexus Buyer in writing.

Supplier Notifications and Material / Process Change Notifications (PCN)

Plexus design and manufacture products which are sold into highly regulated business markets. It is therefore critical that Plexus are notified of any proposed product changes to items on our purchase order prior to implementation of the proposed change. Suppliers of custom parts manufactured to a Plexus supplied drawing or specification must also obtain written approval from Plexus prior to implementation of the proposed change.

Suppliers are required to have a process for qualification and communication of changes which promptly and accurately notifies Plexus of the change. Suppliers are responsible for managing changes made by sub-tier manufacturers within their supply chain.

Suppliers are required to submit a PCN for any proposed changes including the following:

- Change of material or material supplier
- Change in the manufacturing process
- Change in manufacturing name, address, facility, site, or line
- Change to design, specification, or dimension
- Change to testing or testing criteria
- Change in packaging, labeling, and storage
- Change in manufacturing part number
- Change Sterilization or qualification of sterilization

Suppliers must give Plexus a 90 day notice before any PCN going into effect.

Suppliers with a product going End of Life must provide:

- At least 12 months written advanced notice of any product that will be discontinued.
- 6 months advanced notice to the last buy date of a product at its pre-change status.

Failure to comply with this requirement could result in the immediate return of products supplied and/or rework/recall of complete assemblies if necessary. All PCNs, End of Life Notices and Obsolescence Notifications must be forwarded to PCNS@plexus.com.

Additional guidance is provided by following this link:

[Partners / Suppliers / Product Change Notification and PCN Guide](#)

Logistics and Shipments

For international shipments destined to or transiting through the United States and where Plexus is the Importer of Record, Plexus expects all suppliers to adhere to the Plexus U.S. [Commercial Invoicing requirements](#) and where applicable for Ocean shipments also adhere to the [Importer Security Filing \(ISF\) requirements](#). Plexus reserves the right to periodically review the supplier to ensure adherence to the international shipping requirements where Plexus is the Importer of Record. Note: A DDP Incoterm specifies that the seller is responsible for clearing import customs and paying associated duties and fees. Suppliers that have agreed to DDP terms with Plexus must ensure that their supply chain is prepared to handle US customs clearance.

Routing Guide

For both international (Incoterms Ex Works, FCA, etc.) and domestic shipments for which Plexus is paying the freight, Plexus' preferred carrier is FedEx or FedEx Trade Networks. See Plexus' routing guide to determine which is appropriate for each shipment. Additionally, the default freight service level for Domestic shipments is Ground and for International shipments, International Economy unless otherwise noted on the P.O. More expensive service levels such as overnight shipment must be pre-approved by Plexus or specifically noted on the individual P.O. Additionally, Plexus is self-insured for cargo, and no carrier insurance should be checked on the B/L's. Please refer to the following link for the Plexus Routing Guide for shipping / routing instructions by carrier and shipment size, as well as more detailed and helpful notes.

[Partners / Suppliers / Logistics](#)

Packaging Guidelines

Unless otherwise specified or agreed upon, the following guidelines are to be followed.

Boxes of weight greater than 50 pounds must be shipped on a pallet.

Standard pallets of size 40"x48" or less should be used when a pallet is necessary. If oversized pallet is necessary, it must be forklift accessible on all sides.

Loaded pallet height should not exceed 58" from ground level.

It is recommended that suppliers seek out pre-approval from site Plexus Supplier Quality before shipping custom parts.

Packaging should comply with ASTM D4169 (Standard Practice for Performance Testing of Shipping Containers and Systems).

Parts with non-cosmetic surfaces should be packaged in a way to decrease the amount of time and waste associated with the unpacking process. Decrease the amount of plastic and cardboard waste per part while trying to increase the amount of product being received. Create packaging solutions that do not require

individual packaging for each piece and utilize solutions like over packs with dividers to protect the parts as opposed to individual or small batch packaging. For parts that arrive bagged, maximize the quantities per bag when possible and keep the packaging quantities consistent throughout shipments.

Parts with cosmetic surfaces should be packaged in a way to ensure that parts are received defect free. Each part must be properly packaged to decrease the risk of damage to the product while sustaining a large package quantity per skid or box. Look for ways to decrease the amount of plastic waste associated to each part while still protecting the surface of the product. Employ solutions like over packs with dividers or boxes with nested trays to protect parts in place of individual packaging.







Use reusable/returnable containers whenever the cost of the containers and the return transportation is justified. It is the responsibility of the supplier to select or design the containers and assure return to the supplier. All returnable packaging that is not clean and free from dirt, debris, foreign material and damage may be subject to rejection.

The packing slip and any other required documentation are to be with the #1 package on multiple package shipments. Packing slips must be affixed to the outside of the shipping container. They are to be located on the side or end, not on top and securely fixed to the container in a method that ensures it is visible and protected from damage.

Label shown below should be used on the outside of shipping containers. The label should be affixed near the packing slip. If a label cannot be affixed because of the shipping container type, shape, or other constraints, the label must then be affixed to an attached tag. Labels must be placed in a position that would not inhibit scanning.

Changes to support streamlining the receiving process have been added to require a 2D Barcode or QR code for the key fields on the template. Suppliers should prove this label for all parts being shipped to Plexus. Each field should include a field identifier that will allow for mapping of the data in our Warehouse Management System. Supplier not utilizing the ANSI standard for field identification must send a sample to Plexus prior to utilizing the 2D Barcode on Shipments.

Template for packaging label:

From: Supplier Name 1234 Bar Code Ln. Bar Code City, ID 12345 (555) 555-5555	To: Plexus Facility 1234 Bar Code Ln. Bar Code City, ID 12345 (555) 555-5555	
Plexus PO: 345-588991-OP	Plexus Part : AREC08580-345	
 MPN: GRM31CR60J107ME39L	 PART DESCRIPTION Will be placed here	
 QTY: 2000	COO: US 	Plexus Rev/AML: 3-04 Date Code: 1815 or 201815 Lot Code: 123456789
		Package Count: X of Y

Required Fields (Bolded filed in the table below) require barcodes - Must utilize code 39 or code 128)

2D Barcode can be in QR code or standard 2D barcode format. The field identifier must proceed the field entry with a field separator of ";" . Sequence is not relevant since the identifier will be required. The field identifier must also include a ":" character.

Field	Field Identifier 2D Barcode
Manufacturing P/N	1P:
Manufacturer explicit identification based on DUNS-Nr.	12V:
Customer (Plexus) P/N	P:
P.O. #	K:
Customer (Plexus) Rev / AML	2P:
Quantity	Q:
Part Description	Not Required
COO(Country of Origin)	4L:
Date Code	10D:
Lot Code	1D:
MSL Level (when required) based on IPC/JEDEC J-STD-020	Z:

ANSI standards can be found at the following URL:

https://www.eurodatacouncil.org/images/documents/ANS_MH10.8.2%20_CM_20140512.pdf

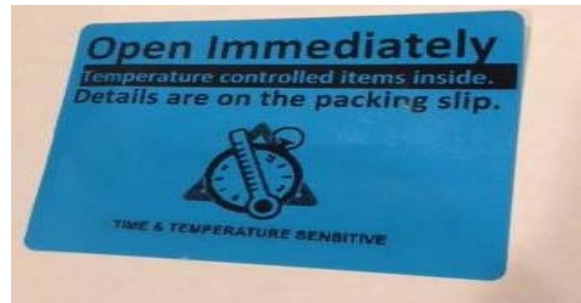
Special Labeling Requirements

If any product is shipped to Plexus that is categorized as:

- 1) Temperature Sensitive Products
- 2) Hazardous-Flammable Material
- 3) Corrosive Material
- 4) Products for Vending
- 5) Products with Cleanroom Requirements
- 6) Products that need to be Quarantined / Tested prior to use
- 7) Products Returned from Outside Service Providers

Each box will require a total of 5 highly visible (4" x 4" preferred), clearly stated labels in locations shown in the photographs below. Additional details are contained within the Plexus Specification DCS#11582, which can be found on the Plexus.com Partners / Suppliers page under Logistics. Please contact the appropriate Plexus buyer or Plexus Supplier Quality representative with any questions.

***Note: Example from work instruction for labeling of temperature sensitive products



Product Shelf Life

Product that is limited by a shelf life must have the period in which the product is usable clearly stated on the outside of the product and packaging. Product must be delivered with a remaining shelf life greater than 50%. In the case where Buyers, POs or specifications dictate alternate or conflicting shelf life criteria it will take precedent.

On Time Deliveries

Our commitment to our customers for on time deliveries can only be realized by your ability to provide goods on time, every time. With that in mind, we have developed a uniform policy to ensure there is no disruption of service. All our purchase orders and subsequent release change notices require that materials be DELIVERED on a certain DOCK DATE. We feel that it is up to you, our suppliers, to arrange that the goods leave your plant in time to reach Plexus on the requested DOCK DATE. Because of the variances in shipping methods, we allow shipments to arrive:

(3) CALENDAR DAYS PRIOR to our listed REQUEST DATE (or) (0) DAYS LATE.

In the event that it is not possible for a shipment to dock on the REQUEST DATE, we ask that you notify the Purchasing Associate or Buyer listed on the purchase order within (24) hours of receipt of the document. At that time, we will assess possible re-routing or other methods necessary to assure that our customer commitment will be met.

Supplier Allocation

If any capacity constraint or shortage occurs, supplier will immediately notify Plexus on the constraint or shortage and ensure that Plexus has priority allocation.

Supplier Rating System (SRS)

Plexus rates each of our suppliers on several key areas of performance. The "Supplier Scorecard" provides information on supplier performance in the areas of Quality, and Delivery. At a minimum, supplier performance is communicated to all suppliers quarterly via a scorecard email notification. If a performance indicator falls, Plexus' expectation is that the supplier investigates the situation to determine the root cause and make the required improvement to address the issue. Please feel free to contact a Plexus Supplier Quality Engineer or Buyer if you have any questions regarding supplier measurement.

Delivery Rating

There are three elements that make up the supplier's delivery score: On Time Delivery to Plexus Required Date; On Time Delivery to Supplier Committed Date; and a Supply Chain Program % score.

On Time Delivery to Plexus Required Date - Delivery to Plexus Requirement is calculated from the receipt date of product at the Plexus dock. A shipment is scored "on time" or "OT" when it arrives in the windows between 3 calendar days (not working days) before the Supplier Required Date and 0 days after. A shipment received after the Plexus Required Date will be scored "Late". The rating is compiled by dividing the total number of "OT" shipments by the total number of Receipts and then multiplying by 100.

On Time Delivery to Supplier Committed Date - Delivery to Supplier Commit is calculated from the receipt date of product at the Plexus dock. A shipment is scored "on time" or "OT" when it arrives in the window between 3 calendar days (not working days) before the Supplier Commit Date and 0 days after. A shipment received after the Supplier Commit Date will be scored "Late". The rating is compiled by dividing the total number of "OT" shipments by the total number of Receipts and then multiplying by 100.

Quality Rating

The supplier's quality score is determined based on the following: Quality Yield %; Paperwork Accuracy; and SCAR performance.

Quality Yield % - The quality yield % is derived by taking the total number of parts received minus (-) the total number of non-conforming parts, divided by the total number of parts received and then multiplying by 100 (regardless of part # differences). The quality yield is calculated using part rejections from the last THREE ACTIVE MONTHS OF DELIVERY through the latest complete calendar month.

Paperwork Accuracy % - A paperwork accuracy rating is used to identify deficiencies a supplier may have documenting a shipment. Paperwork accuracy includes correct PO#, quantity, Plexus P/N, revision level, and enclosure of any required test or quality documents as required on the Plexus PO or Plexus Supplier contract. The paperwork accuracy % is determined by taking the total number of receipts minus (-) the total number of incorrect paperwork occurrences, divided by the total number of receipts and then multiplying by 100.

SCAR (Supplier Corrective Action Request) Performance - Points shall be deducted from a supplier's overall quality score based on SCAR activity during the performance period. All suppliers will begin with a SCAR score of 5. Points will then be deducted for each of the following: SCAR raised during the period; SCAR response received late during the period; and SCAR response remaining past-due at end of the period.

Supplier Lock out

Suppliers that fall below the minimum Quality requirement will not be considered for new orders. Suppliers in this category will be expected to understand and take corrective action for the non-conformances. This will ensure conforming product will be received with all new orders. Suppliers will also be expected to provide copies of the corrective actions taken upon request. If a supplier does not provide acceptable corrective actions, they will remain unavailable for new purchase orders.

Record Retention Requirement

Suppliers shall retain all quality and product related records that support the manufacturing process (records are defined as per ANSI/ISO/ASQ Q9000-2005 as "Document stating results achieved or providing evidence of activities performed") for a minimum period of 2 years. Extended record retention periods may be communicated via Q-Codes or on Purchase Order documentation. For example, records associated with product manufactured to the aerospace standard, AS9100, must be retained for a minimum of 7 years unless otherwise specified within the procurement documentation. Should conflict arise, the longest retention period stated should be applied. Records shall be made available to Plexus, its customers and/or regulatory agencies upon request.

Inspection Acceptance

All products shall be subject to inspection and test at all reasonable times and places by Plexus before, during and after delivery. Any product furnished by the supplier to Plexus not conforming to any agreements or the purchase order will be subject to Plexus' rejection and return to the supplier, at the supplier's risk and expense. Title to any product rejected by plexus will revert to the supplier upon shipment by Plexus.

Non Conforming Materials

The supplier shall not ship defective/nonconforming product to Plexus prior to submitting a written notification and receiving written approval from Plexus. Additionally, Plexus shall be notified immediately of any suspect or defective product that may have escaped the supplier's facility prior to being detected.

Return Material Authorizations

When material is found to be defective, the supplier will be notified and a Return Material Authorization (RMA) number will be requested. The supplier is expected to respond with an RMA number within 24 hours of the request.

Supplier Corrective Action

Depending on the type, extent and severity of a defect, Plexus may request that the supplier formally document the actions taken to correct the issue. This will be handled via a Supplier Corrective Action Request (SCAR). The supplier is expected to respond with their completed Corrective Action within 8 calendar days of the request unless an extension has been granted by the Plexus Supplier Quality representative.

Note: when a supplier is notified of a rejection but does not receive a formal SCAR, it is Plexus' expectation that the supplier take immediate action to contain any additional defects. While no formal response is required, the supplier is still expected to take appropriate corrective action to prevent additional defects from being produced or reaching the Plexus site.

Failure Analysis

Suppliers may be requested to perform Failure Analysis (FA) when the nature of the defect is unknown and requires further investigation at the supplier's facility. The supplier is expected to respond with a completed FA within 8 calendar days of the request, and if not able to provide a completed FA, provide the date when it will be completed and request an extension of the Plexus Supplier Quality Representative.

Costs associated with Non-conforming parts

Plexus manufacturing and quality systems are not designed to "inspect quality" into a supplier's material. We expect material to conform to all applicable specifications (i.e. part drawings as well as agency requirements).

Suppliers may be responsible for costs associated with the effect of shipping defective materials to Plexus. Costs may include, but are not limited to: rework, freight, lab testing, overtime, sorting, scrap, third party containment, customer charges and travel.

Flowdown of Requirements

Plexus requires our Suppliers to provide certain quality or quality documentation with each shipment. The quality or quality documentation required is defined by a flow down message on the purchase order. It is critical that Suppliers review all new PO's and PO changes for the applicable flowdown requirements. Any flowdown requirement, specification, measurement that does not meet the requirements, cannot be shipped to Plexus without prior approval.

A Quality Code (Q-code) is the typical standard mechanism used to communicate/flowdown quality requirements. The Q-code is a predefined list of requirements, and will be assigned to a specific part number as the main mechanism used to convey quality requirements to the supplier. The code will be called out on the PO for each line item, when applicable. Each PO needs to be carefully reviewed for these Q-codes. Any questions can be directed to the site Quality/Supplier Quality contact or the Buyer listed on the PO. Suppliers may use the following link to access a complete list of Q-codes and their requirements.

[Partners / Suppliers / Quality Requirements \(Q-Codes\)](#)

The Q-codes consist of a Q followed by 1-3 alphanumeric characters and refer to a specific set of deliverables. Q-Codes are listed separately on the purchase order for each applicable part number and become part of the 'quality contract' above and beyond the applicable specifications between Plexus and the supplier. Q-codes augment the existing purchase order specifications, but do not supersede any requirements specified. In general, Q-Codes are applied to custom and critical 'per print' fabricated material (e.g., mechanical components, raw printed circuit boards) procured by Plexus. Q-Codes are a valuable, proactive tool for assuring material quality from the Plexus Supplier base.

Suppliers must review all new PO's and PO changes for the appropriate Q-Codes. This will dictate the quality requirements that must be included when a product is shipped. The documentation submitted in response to a Q-Code is part of Plexus' inspection criteria. All parts with Q-Codes are inspected by Plexus to ensure the appropriate documentation is included with the part shipment.

The latest revision of each Q-Code is available on the [Quality Requirements page](#) on the Plexus website (www.plexus.com), it can be found by clicking the following path; Partners > Suppliers > then Quality Requirements (Q-Codes). Please feel free to contact a Plexus Supplier Quality Engineer or Buyer if you have any questions regarding Q-Codes.

Explanation of Q-code requirements

Each Q-code may include one or more requirements. Since many requirements are generic, the following explanations are provided to add clarity and expectations to deliverables which otherwise may be undefined.

All certificates, quality documentation, and/or test reports must include Plexus part number, Plexus PO number, EC/revision level, and quantity.

Capability Study

The supplier will sample product from which the supplier will measure all customer designated CTF dimensions and supplier process control dimensions. All associated data will be submitted to Plexus. The supplier will calculate X-bar, Sigma, test normality and Capability indices. Sample size and minimum Capability indices will be listed on the Q-code or agreed upon between Plexus and the supplier prior to submission.

The Capability Study will be completed on all customer designated CTF or critical dimensions which results in a report that contains the following information:

- Histogram
- X-bar
- Sigma
- Normality test
- Process capability values (Cp, Cpk, Pp, Ppk, etc.)
- All individual data

Other information preferably included with the Capability Study report:

- X-bar-R chart
- PPM equivalents

Certificate of Compliance (C of C)

A Certificate of Compliance certifies that the product being delivered conforms to the following:

- The drawings and specifications
- The requirements of the specific PO

The Certificate of Compliance must include the following:

- Name of Supplier or distributor
- Plexus part number
- EC level or Revision level
- Quantity shipped
- PO number
- Signed by supplier representative

Other information preferably included in a Certificate of Compliance:

- Supplier letterhead or logo
- A title at the top of the document indicating Certificate of Compliance
- Drawing # and revision, when applicable
- Lot code and date code
- Ship date

Electrical Testing Certificate

An Electrical Testing Certificate certifies that the product being delivered conforms to the electrical properties designated on drawing and specifications. The certificate shall include a statement specifying such. The electrical test certificate should be supported with the test/yield data, impedance data and test stamps of the product.

First Article Inspection Report (FAIR)

A first article inspection will be summarized in a report which shows evidence that the supplier produced a part that is in compliance with the specifications. A first article inspection must be included on a part from each unique tool or process (for example a multi-cavity tool would need to have a first article inspection completed on a part from each cavity). The report must include compliance to all part specifications, including dimensions, characteristics, notes, materials, sub-components, etc. for the component or assembly being procured. The supplier must coordinate or flow down a record of FAI compliance (including measurements) for all custom sub-components. In the case of an assembly, the supplier will document the verification of the sub-component on the assembly FAI. All sub-tier FAIR reports must be retained by the supplier and made available upon request. Any changes to the component, sub-component part revision or sub-component material supply must include verification of compliance and resubmittal of the FAIR with the changes included.

The FAIR must include the following information on the report:

- Title referring to a First Article inspection
- Individual Characteristic
- Individual Tolerance or accept/reject criteria
- Individual Inspection/Verification result
- Individual Pass/Fail result
- Verification of all sub- components (OTS and custom)
- Verification of materials used
- Report date
- Supplier sign off

Other information preferably included in a FAIR report:

- Tool used
- Drawing location
- Ballooned drawing
- Inspector
- Supplier approval signature

All part specifications on the FAIR must be within tolerance. Any specification which is not within tolerance cannot be shipped to Plexus without prior approval.

Manufacturing Process Flow

A diagram, routing, or chart which describes ALL the manufacturing process steps and sequence used to produce the specific product.

Material Certification

The material certification must include a statement of verification of all the materials called out on the drawing or specifications.

The Material Certification must include the following:

- A statement of declaration certifying that the materials used to manufacture this item meet the specifications provided by Plexus

The Material Certification should include the following:

- The actual print material callout/s
- Testing certificate
- Signature
- Testing data

If work is subcontracted, the certificate may also indicate that the supplier has relied upon the certifications obtained from its supplier to verify raw materials and sub assemblies. Where possible, Plexus prefers that copies of the actual materials certificates from subcontractors be provided instead of a generic Materials Certificate.

Note: the supplier may combine the Material Certificate and Certificate of Compliance into one document as long as the individual requirements of each document are satisfied.

Quality Control Plan

A Quality Control Plan will be completed and serves as the quality contract which defines the processes and controls used to produce the respective part.

The Quality Control Plan must include the following components of the process:

- Each process step
- Jigs/tools used and asset number
- Equipment used and asset number
- Inspection Criteria for each customer designated CTF/Critical characteristic
- Accept/reject criteria

Supplier Quality Manual

- Each process inspection
- Gauging type and asset number
- Approved Inspector/s
- Frequency
- Sample size
- Actions
- Should

The Quality Control Plan should also include the following components of the process:

- Gage R and R results
- Process capability values

Plexus Fabrication Specification G9000-3

All Printed Circuit Boards (PCB) must conform to the Plexus Fabrication Specification (G9000-3). For future reference and the most updated G9000-3 Specification, please go to www.plexus.com. Select the Partners/Suppliers/ Plexus PCB Fabrication Specification.

Requirements/Standard Compliance for Electronic, Soldered and/or Board Level Components

All soldering operations in electronic assemblies shall comply with J-STD-001 and IPC-STD-610, class 2 unless otherwise specified.

Electronic components shall meet the requirements for soldered surfaces as specified in J-STD-002.

Electronic components shall be packaged in accordance with JEP95, JEDEC Registered and Standard Outlines for Solid State and Related Products.

Non Hermetic Solid State Surface Mount Devices must be defined for moisture sensitivity per IPC/JEDEC J STD-020, packaged in accordance with IPC/JEDEC J-STD-033* and labeled appropriately per EIA JEP 113.

* Plexus' preferred packing method for moisture sensitive component is as per IPC/JEDEC J-STD-033, however we recognize that some manufacturers may have alternative packaging. Prior to the first shipment the manufacture shall provide Plexus objective evidence that these methods and materials do not create moisture barrier risk at the extent of the shelf life. Additionally, a procedure shall be provided as to how to read the exposure level and determine when baking is required prior to use.

Supplier Portal Program

The Plexus Supplier Portal allows suppliers to:

- view/export real time open orders
- view/export forecast
- enter/submit promise dates
- enter Trans Tracker Number
- Shipped via information
- Ship date
- Quantity shipped
- Supplier order number
- Supplier line number



Supplier Quality Manual

- Supplier comments

If EDI is not utilized, suppliers are to request a portal account creation. Details on how to request your Supplier Portal account can be found on Plexus' webpage following Partners/Suppliers/Supplier Portal Document.

Glossary

Capability Study

A capability study is a method of determining the extent to which the long-term performance of a process complies with engineering requirements. The output should lie between upper and lower specification limits (USL; LSL). A capability study is also performed to identify process improvement opportunities.

Certificate of Analysis

The Certificate of Analysis (COA) is a certificate declaring that the manufactured item has been tested to the appropriate specification requirements.

Certificate of Compliance (C of C)

A Certificate of Compliance (also referred to as Certificate of Conformance) is a document that states compliance to all applicable specifications.

- The drawings and specifications provided by Plexus
- The requirements of the specific PO

Certificate of Traceability

The Certificate of Traceability certifies the complete chain of custody for each specific sale back to the OEM.

CTF/CTQ Dimensions

Critical to Function/ Critical to Quality dimensions are those dimensions that have been selected by either Product Engineering or Supplier Quality as being critical to the function of the part or assembly.

Electrical Testing Certificate

An Electrical Testing Certificate certifies that the product being delivered conforms to the electrical properties designated on drawings and specifications.

End of Life Notice

See Product Change Notice

FAIR

A FAIR is a report of a First Article Inspection. A FAIR includes data and documentation from the physical and functional inspection process used to verify that production methods have produced an acceptable part as specified by engineering drawings, purchase order, engineering specifications and/or other applicable design documents.

Ionic Contamination Test Report

A test report showing the lot has been tested for ionic contamination levels.

Full Material Substance Declaration

A document from the supplier providing a breakout of all the materials/substances with weight and %s of all the materials present in the article or product.

Master Planning Family (MPF) Number

The MPF number is a 3 digit unique Plexus assigned identifier added to the end of a customer part number. It is unique to a customer or customer project.

Material Certification

A certificate declaring that materials used meet all the requirements called out on the drawing or specifications.

NRTL

Acronym used for National Recognized Testing Laboratories.

Obsolescence Notification

A specific notification provided by the supplier when they are no longer supporting or building an item/part number. Obsolescence notices shall be sent to pcns@plexus.com.

Process FMEA

A Process Failure Mode and Effects Analysis is a tool used in product development, systems engineering, reliability engineering, and operations management for the classification and analysis of potential failure modes within a system or process.

Product Change Notice (PCN)

Notification from the supplier of a change to a product or process, including but not limited to end of life, obsolescence, and quality notice.

PPAP

Acronym used for Production Part Approval Process. PPAP can be unique or specific to project, but it typically refers to a standard published by the AIAG.

Q-Code (Quality Code)

A Q-code is a predefined list of requirements assigned to a specific part number, and is the main mechanism used by Plexus to convey quality requirements to the supplier.

Quality Control Plan

A Quality Control Plan is a revision controlled plan with approvals that is used to identify and monitor the activity required to control the critical inputs or key outputs for a process and ensure the process will continually meet its product or service goals.