ALLIANCE ELECTRONICS DISTRIBUTOR

Supplier

Quality Manual

22412 Gilberto Rd.
Rancho Santa Margarita, CA 92688
INTRODUCTION

Welcome to Alliance Electronics Distributor (AED)

Alliance Electronics Distributor is a distributor of electronic components and peripherals dedicated to serving their Domestic and International customers with reliable and competitive products and services.

Introduction to Manual

In today’s manufacturing environment, product that is found to be non-conforming at receiving, or during production, causes serious disruptions of the production and shipping schedules, resulting in high production costs. Even the best Receiving Inspection program cannot detect all defective material. Alliance Electronics Distributor requires suppliers to control the quality of material shipped to Alliance Electronics Distributor, so that Alliance Electronics Distributor can be confident of the product when it is received.

In order to be a preferred supplier to our customers, we must continually improve our quality levels. As part of this improvement, we must have a process in place that encourages, supports and ensures our suppliers meet quality performance expectations.

Specific strategies include:

• Long-term partnerships with our suppliers
• Close interaction among engineering, manufacturing, purchasing and quality personnel and our suppliers.
• Assure compliance with ISO 9001-2008, AS9100, AS9120 and other industry and regulatory standards.

This manual details our needs and expectations from you – our partners in order to ensure that purchased material meets Alliance Electronics Distributor’s requirements.

Scope

This information applies to all suppliers who have interest in doing business with Alliance Electronics Distributor. It also applies to Alliance Electronics Distributor’s outsourced partners and their subsidiaries.

This manual supplements the requirements stated on Alliance Electronics Distributor’s Purchase Orders (PO) and applicable commercial and military standards, i.e. FAA, ISO 9001:2008, and AS9100/AS9120. These requirements are necessary to ensure that material delivered to Alliance Electronics Distributor by its suppliers will meet or exceed required quality levels. The requirements, as listed, are based on a defect prevention system, which will improve quality, lower costs and increase productivity.

Acceptance of the purchase order is considered acceptance of Alliance Electronics Distributor’s terms and conditions.

Drawings and engineering specifications set tolerances and performance requirements. The responsibility of each supplier is to ensure that those requirements are met. Alliance Electronics Distributor encourages each supplier to work toward continuous improvement in all areas regarding quality, delivery, and performance.

Alliance Electronics Distributor reserves the right to audit its suppliers for compliance with the requirements stated in this document and applicable standards. Either Alliance Electronics Distributor or its authorized representative may accomplish this through scheduled audits.

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Alliance Electronics Distributor Quality Policy

Alliance Electronics Distributor will consistently provide products and services that meet or exceed the requirements and expectations of our customers. We will actively pursue ever improving quality through programs that enable each employee to do their job right the first time and every time.

Quality is an internal part of our commitment to world-class products and customer service. We will achieve this by:

1. Knowing who our Customers are and what they want - through open communication.
2. Understanding the requirements of our jobs and the systems that support us - through training and education.
3. Making continuous improvement a part of every day and every job - through the use of team participation and measurements.
4. Ensuring that our Policy and Procedure Manuals reflect what we actually do.
5. Remembering that we are here because of our Customers! Realizing our Customers are the reason we have our jobs, and that through on-time delivery of quality parts at a fair market price is how we will keep them!
6. Helping each other to help ourselves!
7. Understanding how our jobs fit into the overall flow of work at AED.
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1.0 Quality Management System Requirements

1.1 Quality Management System

Each Alliance Electronics Distributor supplier is required to maintain an effective quality management system, preferably one that conforms to ISO 9001:2008, AS9100/AS9120 Quality Management System – Requirements. In addition, the supplier must meet all other requirements of this manual.

1.2 Quality Manual and Procedures

The supplier, as requested, will furnish Alliance Electronics Distributor with a copy of the supplier’s Quality Manual and supporting procedures. This includes detailed documents and work instructions specific to production of material for Alliance Electronics Distributor.

1.3 Flow-down to Sub-tier Suppliers

The supplier shall flow down to its sub-contractors all quality related requirements specified in the applicable purchase order(s) and this manual, including regulatory requirements.

1.4 Control of Sub-tier Suppliers

Suppliers are responsible for the quality of materials and components provided by their sub-tier suppliers and sub-contractors. Alliance Electronics Distributor suppliers must impose controls on their sub-tier suppliers that provide quality results and documentation comparable to the controls applied to suppliers by Alliance Electronics Distributor. The extent of the controls may vary, depending on the nature and complexity of the product and processes, but should normally include:

- Evaluation and qualification of sub-tier supplier facilities
- Control to ensure that raw materials used meet Alliance Electronics Distributor’s requirements
- Controls to ensure that the sub-tier suppliers of components used are those approved by Alliance Electronics Distributor, where applicable
- Ensure that sub-tier suppliers have an ESD control program that meets or exceeds the needs of Alliance Electronics Distributor if the parts or materials are ESD sensitive
- Part qualification, including first article inspection and process capability studies of as applicable
- Control of drawings/revisions
- Control of nonconforming material
- Corrective action and preventive action programs
- A continuous quality improvement program

Where appropriate, Alliance Electronics Distributor may specify the sub-tier suppliers that may be used, evaluate and qualify the sub-tier supplier’s facilities, and assist the supplier in controlling the sub-tier supplier. Typically, this occurs when the sub-tier supplier is an essential component of the supply-chain process. Alliance Electronics Distributor reserves the prerogative to evaluate the quality system and records of such sub-tier suppliers as necessary. In the event of Alliance Electronics Distributor’s involvement, it does not absolve suppliers of the ultimate responsibility for the quality performance of their sub-tier suppliers.
2.0 Supplier Qualification Process

All suppliers of production materials to Alliance Electronics Distributor must be qualified suppliers. The extent of the qualification process is dependent upon the criticality of product purchased and other factors determined by Alliance Electronics Distributor. The qualification process in its most complete form consists of three parts:

- A questionnaire completed by the supplier.
- A quality management system self-assessment completed by the supplier, using the Alliance Electronics Distributor supplier assessment survey form. This is returned, along with the supplier’s quality manual and documentation for review by Alliance Electronics Distributor.
- An on-site assessment by Alliance Electronics Distributor personnel or their authorized agents.

Alliance Electronics Distributor periodically reevaluates suppliers through the use of quality performance data and/or on-site assessments.

2.1 New Supplier Questionnaire

In the early stages of the supplier selection process, potential suppliers are sent a questionnaire. This questionnaire solicits general information about the company such as location(s), size, capabilities, and financial stability as well as detailed questions regarding the Company’s quality management system and quality history.

2.2 New Supplier Self Assessment

When a new supplier is being considered, they are sent a quality management system self-assessment survey form. The supplier completes the self-assessment and returns it along with a copy of their quality manual and supporting documents. Alliance Electronics Distributor will review the quality manual, procedures, and survey to determine if the documented quality system meets Alliance Electronics Distributor’s requirements.

2.3 On-Site Assessment

For suppliers of critical components, an on-site assessment of the supplier’s facility maybe performed. The on-site assessment includes three components:

- A quality assessment to determine whether the supplier’s quality management system is in place and functioning effectively.
- A business assessment to determine whether the supplier has financial resources, production capacity, and other business resources needed to fulfill Alliance Electronics Distributor’s production needs.
- A technology assessment to determine whether the supplier has the needed technical resources, including production and inspection equipment, facilities, engineering resources, etc.

If the assessment team determines that the supplier meets Alliance Electronics Distributor’s requirements, Alliance Electronics Distributor qualifies the supplier to bid on new business and supply production materials.

2.4 Periodic Reevaluation

Alliance Electronics Distributor periodically reevaluates current suppliers through the use of quality performance data and/or on-site assessments. If requested, the supplier shall make their facility available for on-site process verification by Alliance Electronics Distributor personnel, with reasonable notice.
3.0 Part Qualification

The supplier is responsible for submitting all First Article data if requested by Alliance Electronics Distributor on the first article requirements checklist. Alliance Electronics Distributor and the supplier will agree on the number of the samples to be checked and submitted with the first article data. Where possible, all First Article documents should be submitted to Alliance Electronics Distributor Quality Assurance Manager in electronic format (preferably Adobe Acrobat or Microsoft Office).

In some cases Alliance Electronics Distributor personnel may wish to be present during the initial production run. This will allow Alliance Electronics Distributor to validate and verify the process before any product is shipped.

3.1 First Article Requirements Checklist

For each new or changed part, Alliance Electronics Distributor sends the supplier a First Article Requirements Checklist, listing the steps and information that must be submitted for qualification of the component or assembly for production. The checklist items selected are based on the type of component or assembly to be supplied.

3.2 Material Certification/Test Report

When requested, the supplier must provide a material certification/test report. This report must include the specification number, specified material and/or physical requirements, and the inspection/test results. A simple statement that the material meets the requirements is not acceptable. Each report must be traceable to the supplier’s material, and must be signed by the organization that performed the testing.

3.3 Failure Modes and Effects Analysis (FMEA)

When requested, the supplier must perform a Process Failure Modes and Effects Analysis (PFMEA), and submit it for approval. For parts and assemblies that are designed by the supplier, the supplier should also perform a Design Failure Modes and Effects Analysis. The PFMEA considers all reasonably foreseeable potential failure modes of each process. Based on the potential seriousness and likelihood of the problem, the supplier develops manufacturing controls. The PFMEA should be a living document, and should be updated when process changes occur, or when defective material is produced. PFMEA methods and examples can be found in Potential Failure Mode and Effects Analysis published by AIAG.

3.4 Control Plan

When requested, the supplier must develop a control plan, and submit it for approval. The control plan is a detailed description of the supplier’s proposed processing steps required to produce the part, and the controls that are put into place to control the quality at each step. The control plan must include all in-house processing, external processing, inspection, packaging, and shipping. Suppliers may use their own format. Measuring devices and fixtures designed and built to check Alliance Electronics Distributor parts must be identified with a gage number and drawing, and must be listed on the control plan.

The control plan must include all critical characteristics. Where detailed instructions are required, the supplier details those instructions in a work instruction, or equivalent, which must be listed in the control plan. Inspection methods, sample sizes, and sampling frequencies should be based on the process capabilities, seriousness and likelihood of potential non-conformances, and process stability. Critical characteristics that do not meet Alliance Electronics Distributor’s process capability requirements must be inspected 100%, unless Alliance Electronics Distributor approves alternate control methods in writing.

3.5 Electrostatic Discharge (ESD) Susceptibility
3.10 Traceability

The supplier must plan for traceability of components. The supplier will provide a written plan specifying how components will be marked with serial or lot numbers and date codes if required, or how containers will be
identified with lot numbers or date codes if component marking is not required. The plan will also include sizes of lots or batches. Where possible, batch sizes should be minimized to aid in containment should quality problems be found.

4.0 Manufacturing Control and Quality Requirements

4.1 Process Control

In order to ensure manufacturing control, the supplier shall establish and document process standards and criteria for all aspects of the manufacturing operation. These standards shall include documented route sheets and processing specifications that identify specific requirements.

The supplier shall assure that all incoming materials and components used in the manufacture of products to be delivered to Alliance Electronics Distributor shall be inspected, tested or otherwise verified to be conforming prior to use or processing. Non-conforming material shall be conspicuously identified and segregated to prevent commingling with acceptable material until properly dispositioned. Material that is found non-conforming can only be reworked back to drawing or specification requirements. Material that cannot be reworked will not be dispositioned as use-as-is by the supplier without written approval from Alliance Electronics Distributor’s Quality Assurance department. Contact the Alliance Electronics Distributor buyer immediately should either of these dispositions be required

Alliance Electronics Distributor encourages the use of statistical methods to control quality. Such methods include Statistical Process Control (SPC) techniques. In some cases, Alliance Electronics Distributor may require the supplier to submit quality control plans and process flow charts in advance of the start of manufacturing.

Alliance Electronics Distributor may require the supplier to participate in pre-production review and readiness meetings. Items covered in these meetings could include the following:

- Quality Planning
- Specifications & drawing requirements
- Process flowcharts and control
- FMEA (Failure Modes and Effects Analysis)
- Critical characteristic selection
- Process capabilities
- Test and Qualification
- First Article Inspection
- Metrology, gaging, and measurement methods
- Statistical Process Control
- Packaging, labeling, and delivery
- Documentation and record retention
- FAA requirements – Form 8130-3 / JAA Form 1

4.2 Statistical Process Control

Where specified in the control plan, the supplier is required to apply effective statistical process controls. Effective controls must include:

- The control chart displays control limits that are correctly calculated (specification limits may not be used as control limits).
- The control chart is at the process area, visible to the operator, or persons who are responsible for controlling the process.
For each out-of-control condition, actions are taken to bring the process back into control. Actions taken to bring the process back into control are recorded. Product produced during any out-of-control condition is sorted, scrapped, reworked or dispositioned through the supplier’s material review process.

4.5 Lot Control

A lot consists of product of one part number and revision that are made at the same time, under the same processing conditions, from the same lot of raw materials. The primary purpose for identifying lots is to determine the scope of actions that must be taken when problems arise during further manufacturing or with customers. Each container of material shipped to Alliance Electronics Distributor must be identified with the Supplier’s lot number. Inspection records must be traceable to lot numbers.

The following are typical conditions that result in a change of lot numbers:

- Change of part number or revision
- Change of part number or revision of components
- Interruption of continuous production (typically for more than a few hours)
- Repairs or modification to the tooling or equipment
- Tooling changes (other than minor adjustment or replacement of consumable tooling)
- Change to a different lot of raw materials
- Process changes

4.6 Traceability

Traceability ties finished product back to the components used in the product. When traceability is specified, the traceability marking should be effective down to the individual component, i.e., lot code; batch or serial should be identifiable throughout Alliance Electronics Distributor’s processes.

4.7 Workmanship

Workmanship standards shall be in compliance with those called out on the drawing or specification, or when not stated, best available industry standard. If internal standards are developed, or industry standards are used such as ANSI or SAE, they must be compliant with invoked standards. They must also be acceptable to Alliance Electronics Distributor Quality Assurance Department.

4.8 Safety

At no time should any customer, or person at Alliance Electronics Distributor facility, be exposed to hazardous material or situations that are not inherent in a component’s structure. Residues, films, out-gassing products and packaging materials should comply with OSHA (Occupational Safety & Health Association) standards. For items with inherent hazards, safety notices must be clearly observable. As applicable, MSDS sheets must be provided during the First Article process.

4.9 Maintenance
The supplier must maintain all facilities, manufacturing machines, tools, measuring devices, and other equipment in such a manner that the supplier can support Alliance Electronics Distributor’s production requirements, and the quality of parts manufactured for Alliance Electronics Distributor is not degraded in any way.

4.10 Electrostatic Discharge (ESD) Controls

If the supplier furnishes ESD-sensitive materials, the supplier must maintain an effective ESD program that meets all requirements for the material produced.

5.0 Drawings/Changes

5.1 Drawing and Change Control

The supplier must have a documented system for assuring that the latest Alliance Electronics Distributor drawings are in effect at their facility. The supplier’s quality management system must contain a documented procedure that describes the method used for the receipt, review, distribution, and implementation of all changes to drawings and specifications. In addition, the procedure must address control of obsolete drawings and specifications. A documented procedure should also detail the method used to contain new or modified parts until approved by the customer.

5.2 Process Changes, Engineering Changes

Suppliers must have systems in place to control changes to drawings, specifications, processes, or produced parts. Systems should be capable of handling changes being requested by the customer, and also changes requested by the supplier.

**NOTE:** The First Article approval process is directed at a given part number for a specified revision level produced in a specific area of the manufacturer’s facility. Suppliers may not make any changes in their process, location, material, or to the part without written approval from Alliance Electronics Distributor. The supplier must formally request a process change on all Alliance Electronics Distributor components.

5.3 Supplier Process Change Request (SPCR)

A Supplier Process Change Request (SPCR) is used to request a change to a released part, process, drawing, or specification. Alliance Electronics Distributor encourages SPCRs for process improvement with the stipulation that before an SPCR is submitted, the supplier thoroughly reviews their FMEA and control plan to assure that all process-related issues have been addressed and resolved.

The originator of an SPCR includes the following information:
- Drawing or part number
- Drawing or part title
- Description of problem or recommended change
- Reason for change or “rationale”
- Proposed effective date

The supplier submits the SPCR with the revised FMEA and control plan (if applicable) to Alliance Electronics Distributor for evaluation of the following:
- Supplier-demonstrated process capability and stability
- Comparison to First Article data
- Industry standards
- Supplier process engineering capabilities

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• Supplier’s adherence to control plan

After Alliance Electronics Distributor has completed the review, and concurs with the supplier, Alliance Electronics Distributor will notify the supplier as to the final disposition of the SPCR and part submittal requirements and dates.

When monitoring is required, the appropriate markings must be identified on the lots etc. for a specified time frame as decided jointly with Alliance Electronics Distributor and the supplier.

5.4 Supplier Deviation Request

A supplier is never permitted to knowingly ship product that deviates from the print, specification limits, or design intent without written authorization from Alliance Electronics Distributor. If such a condition exists, the supplier may request Alliance Electronics Distributor to allow shipment of the product. This is accomplished by initiating a Deviation Request.

If directed by Alliance Electronics Distributor, the supplier must send samples of non-conforming items to Alliance Electronics Distributor for evaluation. The cost of any testing required to determine the acceptability of the product will be charged to the supplier. Alliance Electronics Distributor will determine the item’s acceptability and what corrective actions (if any) are required beyond the deviation. If approved, Alliance Electronics Distributor will send a written deviation approval to the supplier.

The deviation is only intended to be an interim action and is not to be construed as an engineering change. The supplier must begin work immediately to correct the condition in question. This must be accomplished within the time frame stated on the deviation. Failure to comply with the mutually agreed upon closure date for the deviation may result in the supplier’s rating being affected.

In all cases, the supplier must fully contain all product suspected of being non-conforming at their facility.

Any parts sent to Alliance Electronics Distributor that have been approved on a Deviation must be clearly identified on the box, container, or other packaging method with the appropriate markings decided jointly by Alliance Electronics Distributor and the supplier.
6.0 Packaging & Labeling

6.1 Packaging

Each supplier must adequately plan for packaging. Alliance Electronics Distributor encourages supplier-initiated packaging improvements. Suppliers will provide packaging that provides protection from any damage that may occur. Packaging, labeling, and shipping materials must comply with the requirements of common carriers, in a manner to secure the lowest transportation costs.

Packaging for ESD sensitive items must meet appropriate ESD packaging requirements. Contamination is a serious concern to Alliance Electronics Distributor. Packaging must protect the components from contamination, including fibers and Foreign Object Debris (FOD) from the packaging materials.

Expendable materials and packaging must be legal and safe for standard “light industry” disposal. The preferred maximum weight of manually handled packs is 40 lbs. The maximum acceptable weight is 45 pounds, unless approved by Alliance Electronics Distributor in writing.

Whenever possible, only one part number and one supplier lot is to be packaged in a shipping container. When more than one part number or lot number is packaged in a shipping container, each part number and/or lot number must be separately packaged (i.e. bags or boxes) inside the container, with each labeled as to the contents.

6.2 Labeling

Each shipping container or inside package must contain the following information:

- Manufacturer part number (if no manufacturer part number exists, supplier part number is used)
- Quantity
- Supplier’s Name
- Purchase Order Number
- Lot identification (if required)
- Required ESD Susceptibility Label on packaging for ESD sensitive items, using the Electronic Industries Association Standard EIA-471 symbol or equivalent.
7.0 Corrective Action System

Alliance Electronics Distributor requires suppliers to utilize a closed-loop corrective action system when problems are encountered in their manufacturing facility, or after nonconforming product has been shipped to Alliance Electronics Distributor. Alliance Electronics Distributor may request that a supplier take corrective action via a written Supplier Corrective Action Request (SCAR). A SCAR may be initiated by the rejection of material at Alliance Electronics Distributor or may be based on a trend or repeated rejections or failures.

7.1 Corrective Action Process Approach

The corrective action system utilized should be similar to the process outlined below. The focus should be on identifying the root cause(s) of the problem and taking action to prevent its recurrence.

- Use a team approach
- Describe the problem
- Contain the problem
- Identify and verify root causes(s)
- Implement permanent corrective actions
- Verify corrective action effectiveness
- Close the corrective action

7.2 Supplier Corrective Action

Alliance Electronics Distributor issues a Supplier Corrective Action Request (SCAR) to a supplier when nonconforming parts are found at incoming inspection, in production, in test, or by an Alliance Electronics Distributor customer. They can also be issued as a result of a supplier audit. The supplier is required to respond by returning the SCAR back to Alliance Electronics Distributor within fourteen (14) business days or sooner. The following provides a brief outline of the SCAR procedure that suppliers to Alliance Electronics Distributor should comply with:

- Alliance Electronics Distributor requires that the supplier take immediate containment action upon notification of the nonconformance. The supplier must submit a written response to Alliance Electronics Distributor, reporting the Supplier’s initial observation and defining the interim containment plan within three (3) business days of notification. The Supplier’s Initial Observation is an acknowledgement that the Supplier has been informed of the problem, and has begun to gather information about the problem.

- The containment plan must clearly define the containment actions at the supplier’s facility to assure that no nonconforming product is shipped to Alliance Electronics Distributor. If suspect product has already been shipped, the supplier must address all suspect stock in transit and any stock at Alliance Electronics Distributor. The supplier will assist Alliance Electronics Distributor in identifying customer risk by identifying all suspect lot numbers and associated quantities involved.

- Within one (1) weeks after the original notification, the supplier must report the results of the Supplier’s investigation into the cause of the problem.

- Within two (2) weeks from the initial notification date, the supplier must submit the corrective action to be taken to prevent recurrence of the problem, and the effectivity date (the date the corrective action will be implemented.) Actions such as “train the operator,” “discipline the operator,” or “increase inspection,” are typically not acceptable corrective actions.

- The supplier is required to keep Alliance Electronics Distributor informed of progress towards implementing the corrective action. When corrective action implementation is complete, the supplier and Alliance Electronics Distributor verify that the corrective action is effective in preventing the problem’s recurrence.
8.0 Supplier Monitoring

Alliance Electronics Distributor continually monitors its suppliers to ensure they continue to meet Alliance Electronics Distributor’s requirements, and to ensure that the supplier continues to ship acceptable parts. This may consist of:

- A quality management system surveillance audit at the supplier’s facility
- An on-site audit of the supplier’s control plan
- A random incoming inspection audit of a batch of product
- Source inspection of product at the supplier’s facility
- Nth Article Inspection
- Review of supplier-furnished data packages
- A supplier progress review meeting conducted periodically at the supplier’s site or Alliance Electronics Distributor to review supplier performance and progress

8.1 Supplier Audits

Periodically, Alliance Electronics Distributor may audit the supplier’s quality management system. The supplier must make their facility available for on-site process verification by Alliance Electronics Distributor personnel at any time, with reasonable notice. This may be a full or abbreviated documentation and on-site audit. The purpose is to evaluate any changes that may have occurred in the supplier’s quality management system, and to assess the supplier’s continuing commitment to quality improvement.

Periodically, Alliance Electronics Distributor may also audit the supplier’s continuing conformance to the control plan approved in the First Article process.

8.2 Supplier-Furnished Lot Documentation

Alliance Electronics Distributor may require the supplier to furnish inspection, test, process performance, or other quality data with each shipment to ensure that the product meets Alliance Electronics Distributor’s requirements. When data submission is required, the data must accompany each shipment, or be e-mailed or faxed to Alliance Electronics Distributor at the same time the lot is shipped. All documentation must be clearly identified with Alliance Electronics Distributor’s part number, and the supplier’s lot number.

9.0 References

- AED AS9120A Quality System Manual
- ISO 31000 Risk Management-Principles and Guidelines
- SAE AS9120A Quality Management Systems - Requirements for Aviation, Space and Defense Distributors.

10.0 Revisions

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## Appendix 1

### C = 0 SAMPLING PLAN

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*Indicates entire lot must be inspected

NOTE: The Acceptance Number in all cases is ZERO.