

QUALITY ASSURANCE MANUAL

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QUALITY POLICY

INTRODUCTION

The purpose of this manual is to document the company's quality system, to instruct and guide employees whose actions affect product quality and to inform the company's customers what controls are implemented to assure product quality.

The Quality Policy of Tooling & Assembly Solutions is based on customer satisfaction. We strive for continuous improvement in our quality systems and meeting the objectives of our company:

- Supplying products that meet or exceed our customer's requirements
- Providing a service that results in customer satisfaction
- Continuous development of a dependable vendor base

We are committed to continuous improvement in quality and the assessment of the quality system to assure its suitability to meet the requirements of our company and the requirements of our customers.

By meeting our objectives defined within this manual we will be able to:

1. Provide defect free products.
2. Provide customer satisfaction by providing:
 - a) On time deliveries.
 - b) All contract requirements are met.
 - c) Exceptional product quality.
 - d) Exceptional service quality.
3. Assist vendors and work with subcontractors to reduce late deliveries and delivery of defective product.

Quality Assurance Manual

For

Tooling & Assembly Solutions

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FORMS

Tooling & Assembly Solutions

Quality Assurance Manual

1.0 STATEMENT OF OBJECTIVE

- 1.1 The Objective of Tooling & Assembly Solutions is to clearly define the procedures and responsibilities of a total quality assurance program with the ultimate goal being to provide our valued customers with a precision part or product that will meet or exceed their individual specifications or requirements.
- 1.2 Provide detailed procedures required to accomplish uniform quality assurance for this company's parts or products.
- 1.3 Furnish general-purpose information useful in the administration of quality assurance activities.
- 1.4 Any product supplied by Tooling & Assembly Solutions under contract shall be manufactured under appropriate institutes' and societies' specifications or their supplemental specifications and shall be subject to the quality control standards outlined therein.
- 1.5 A Copy of this manual will be issued to all department managers, sales representatives and manufacturers for Tooling & Assembly Solutions as a required reference.
- 1.6 A copy of the Tooling & Assembly Solutions Quality Manual is available to qualified personnel upon request.
- 1.7 Revisions to our policy will be issued when deemed necessary and shall be recorded and authorized on the revision notice page of this manual. Revisions shall be numbered, dated and indicate sections and paragraphs revised

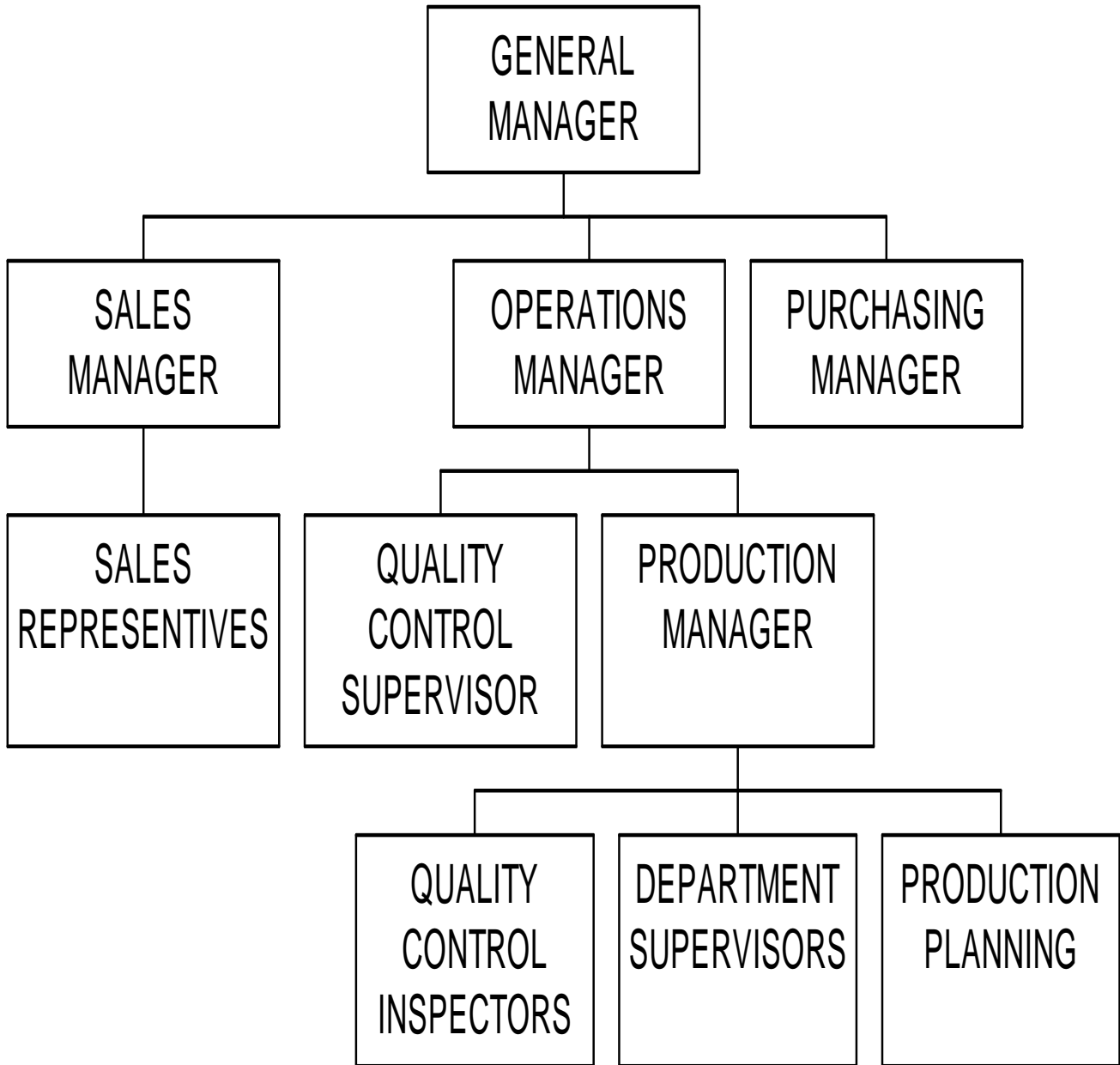
2.0 AUTHORITY FOR IMPLEMENTATION

The general management of Tooling & Assembly Solutions authorize the policies and procedures contained in this Quality Assurance Manual.

The General Manager and Operations Manager delegates to the Quality Control Supervisor the authority to establish, document and administer the necessary guidelines, requirements and controls to effectively implement the statement of Objective (detailed in section 1).

The Quality Control Supervisor shall have the responsibility and authority to assume compliance to this manual.

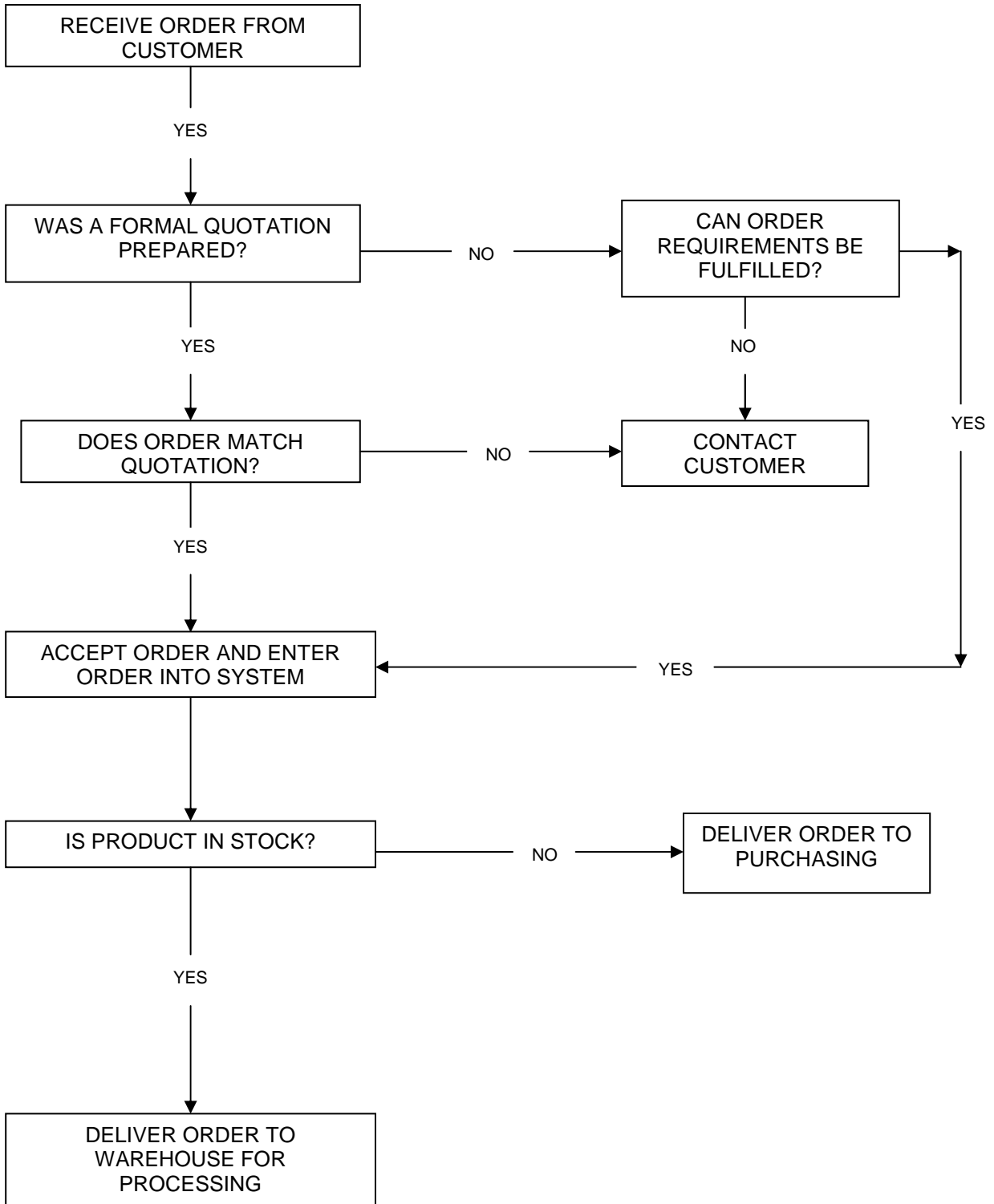
3.0 ORGANIZATIONAL STRUCTURE



4.0 SALES RESPONSIBILITY

- 4.1 The correct interpretation of customer needs and specifications, whether verbal or written, cannot be overemphasized. The sales order is the foundation for the complex chain of events leading up to shipment of a finished quality product.
- 4.2 All sales orders and specifications must be routed through the General Managers office for approval. The General Manager will require written customer acceptance of particular specifications prior to a sales order being finalized for all first time orders and parts. The purpose of the contract review is to verify that the customer's requirements are adequately defined and documented and have been understood.
- 4.3 On all first time orders customers will be required to fill out Part Information Sheets that details all critical information for that part such as tolerance, radius, finish, packaging and any other pertinent facts. These sheets will be kept on file and all orders will be made according to that information. That information will be reviewed with the customer upon acceptance of each order thereafter.
- 4.4 Upon acceptance of a sales order, delivery will be based on current backlog and materials availability. The Production Manager shall be consulted regarding unusual customer requests and/or specifications before a delivery date is scheduled.
- 4.5 Upon acceptance of the purchase order based on the information above, samples will be provided for all first time parts. These samples will need written acceptance confirmation by the customer prior to the production run.
- 4.6 Throughout the sales process, customers must be confident that Tooling & Assembly Solutions is working hard to provide them assured quality in both a product and a reliable delivery schedule.
- 4.7 Copies of the sales order, along with other pertinent information are kept on file in the sales office. Records of all review activities are maintained as evidence.
- 4.8 All products are identified with the actual product part number or where only a description exists, the company's internal part numbers are assigned by the Sales Department.

CONTRACT REVIEW AND ORDER ENTRY FLOW CHART



5.0 ENGINEERING/BLEUPRINT CONTROL

- 5.1 When necessary the General Manager or Production Manager shall request additional information from the clients Engineering Department on the parts or product drawings to make sure that they are of an acceptable quality for reproduction or legibility necessary to complete a sales order based on a specific customer contract.
- 5.2 Any special and pertinent information necessary to the manufacture of a customer part or product, such as special processes, dimensional requirements, special materials or specific blueprint requirements will be kept as a matter of record in the General Managers, Sales Manager, Quality Control Managers and production Managers office. This information is reviewed prior to duplicate order acceptance and production.
- 5.3 It will be the responsibility of the customer to supply Tooling & Assembly Solutions with the issuance and maintenance of up-to-date drawings and specifications and other engineering data. It will be Tooling & Assembly Solutions responsibility to make sure that information is channeled to the proper parties prior to production.
- 5.4 All obsolete manufacturing data is returned to the Production Manager and destroyed. A complete file of all revisions and pertinent information is maintained and kept by the General Manager.
- 5.5 When drawings are revised, they shall be stamped and dated as such by the customer prior to release, thus signifying an up-to-date print.
- 5.6 No one is allowed to use any print not clearly legible or with hand written changes or notes unless prior approval is received from the customer or customer representative.
- 5.7 It shall be the responsibility of the Quality Control and Production Control Departments to insure that all manufacturing data is kept clean and legible.
- 5.8 All products are identified by a part number or description correlated to corresponding drawings, specifications and other technical documents.

6.0 PURCHASING DEPARTMENT / MATERIALS MANAGEMENT

- 6.1 The company assesses its subcontractors and purchases only from those that can satisfy the company's quality requirements. Purchasing documents clearly and completely describes ordered products, including quality requirements.
- 6.2 The Purchasing Department prepares all purchasing documents. The documents clearly and completely describe ordered products. They include precise identification of the products, reference applicable standards and state quality requirements. The General Manager reviews and approves all purchasing documents prior to release.
- 6.3 The company defines subcontractors as vendors who deliver their standard products, as vendors who design and/or manufacture products from the company's drawings or specifications, or vendors who perform processing operations.
- 6.4 All requisitions for materials that require mill certifications or special processes must contain full information as to work order number, part number, applicable specifications and/or requirements necessary.
- 6.5 All mill certificates for raw material will be forwarded to the Quality Control Department for auditing and approval prior to being entered in the applicable customer's permanent file.
- 6.6 For all raw materials and outside processes only those sources, which have been approved by the Quality Control Department as having an adequate quality assurance program or an alternate program to insure a quality product, will be used.
- 6.7 Quality performance of all subcontractors is monitored. Those showing inadequate performance are asked to implement corrective actions and are discontinued if there is no improvement or desire to improve.
- 6.8 If it is deemed desirable or necessary to develop new sources for raw materials or outside process, upon request from the applicable department, Quality Control will survey such sources to determine the adequacy of their quality assurance system and their ability to produce to Tooling & Assembly Solutions high quality standards and specifications. The Quality Control Department shall have the authority to disapprove any vendor not conforming to Tooling & Assembly Solutions requirements.

7.0 PRODUCTION RESPONSIBILITY

- 7.1 It is the prime responsibility of the production Supervisory personal to coordinate all efforts in manufacturing a part or product to all applicable standards and customer requirements.
- 7.2 Strict adherence to applicable and engineering specifications is mandatory in all manufacturing operations.
- 7.3 All work orders must be accompanied by Quality Control approved blueprints and paperwork necessary to assure a part or product is manufactured to a customer's requirements, and guidelines.
- 7.4 No one is allowed to use a drawing not clearly legible or with handwritten changes or notes not authorized by Quality Control, Production Control and concurrence with or customers.
- 7.5 No production worker is to undertake any job operation without a clear understanding of the work to be performed.
- 7.6 All materials and parts in process must be clearly identified at all times.
- 7.7 It is the department supervisors' responsibility to reassure themselves that every production worker understands what is expected.
- 7.8 The production supervisors shall take all necessary steps to meet the scheduled production dates.
- 7.9 When a specific manufacturing process requires an inspection, the Quality Control Department is to be notified.
- 7.10 If any person notices any discrepancy on a work order, blueprint, or contract, the Quality Control Department is to be notified.
- 7.11 A schedule of periodic tool inspection and maintenance is to be in effect.
- 7.12 All Production personal will give their full cooperation to the Quality Control Department and its designated personnel.

8.0 QUALITY CONTROL RESPONSIBILITIES

- 8.1 The Quality Control Supervisor is responsible for planning, developing, initiating, coordinating, implementing and maintaining the most effective and cost efficient procedures for optimum assurance and control.
- 8.2 The Quality Control Supervisor shall interface between Tooling & Assembly Solutions management and the manufacturers to solve quality-related problems that may occur.
- 8.3 The quality control department is responsible for maintaining accurate and complete inspection records, documentation and specifications necessary for a complete quality program.
- 8.4 The quality control department shall provide or aide with the information and analysis and use of records as a basis or foundation for any action deemed necessary by management.
- 8.5 The quality control department shall provide or aide with the inspection of all tooling, materials and procedures.
- 8.6 Personnel performing quality control functions shall have sufficient training, defined responsibilities, authority and the organizational freedom to identify and evaluate quality related problems.
- 8.7 For best and unrestricted performance, the Quality Control Supervisor and staff personnel will be directly responsible to the general management of Tooling & Assembly Solutions.
- 8.8 To insure the continuing top performance of the quality control department, the management of Tooling & Assembly Solutions may at any time conduct an audit to guarantee the status and adequacy of the "Quality Control System."

9.0 RECEIVING INSPECTION

- 9.1 Copies of all purchase orders, pertinent to Section 6.4 and 6.5 of this manual shall be submitted to the quality control department to determine compliance to the contractual obligations and aid in determining which upcoming inspection functions will be necessary.
- 9.2 All raw materials and outside processes may be subjected to inspection directed by the Quality Control Supervisor.
- 9.3 Upon arrival of all product from outside sources, whether product for processing from a customer, raw material, or any item which may effect a product for any customer the goods may not be removed from the receiving area until receiving inspection is conducted.
- 9.4 When any employee becomes aware of the arrival of any delivery, he / she is to contact the Receiving Manager, Quality Manager or Production Manager immediately. Only the previously mentioned Managers are authorized to sign for the receipt of any incoming product.
- 9.5 The Manager is to inspect the arriving goods against the associated Purchase Order, Service Order, or other affiliated documents indicating the quantity and criteria of the goods or services ordered.
- 9.6 After acceptance of the received product the Manager is to acknowledge receipt in the fashion required by the shipper. The product is to be properly identified as to it's quantity and content (i.e.: material type, size, etc.) and placed into the proper storage or process staging area depending on the nature of the item.

10.0 IN-PROCESS INSPECTION

- 10.1 To assure that the proper quality level and all contractual obligations are met, all parts, processes and work-affecting items are subject to inspection.
- 10.2 It is the Quality Control Supervisor's responsibility to establish inspection points wherever and whenever it is necessary to guarantee the Tooling & Assembly Solutions policy.
- 10.3 The preparation, maintenance of and compliance with work instructions shall be monitored as a function of the Quality Control Department.
- 10.4 Any tooling or fixtures being used to produce customer parts is subject to periodic inspection.
- 10.5 A first part inspection will be performed at every operation outlined on the process sheet or work order as directed by the Quality Control Supervisor in conjunction with the Production Manager. Results of this inspection will be entered on a "First Article Inspection Form" and kept on file.
- 10.6 After first article approval, it is the operator's or workers responsibility to maintain that same quality level as approved by the inspector.
- 10.7 Roving inspections will be executed during the duration of the operation to assure compliance.
- 10.8 The Quality Control Department will provide specific inspection procedures in coherence with any special contractual requirements.
- 10.9 Any parts or material determined to be scrap must be permanently marked and placed in a special holding area and disposed of as quickly as possible.
- 10.10 Discrepancies that recur either with vendor parts or materials of Tooling & Assembly Solutions manufactured parts or assemblies, will trigger a "Trouble Investigation Report." Purchasing (with the assistance of Quality Control) and /or the manager will take the necessary steps for corrective action.

11.0 PRE-SHIPMENT INSPECTION

- 11.1 Prior to the shipment of an order, all customer product will be subjected to pre-shipping inspection on a lot sample basis.
- 11.2 The Quality Control Inspector will ensure that parts are packaged or palletized properly according to customer requirements and that all outside labels or tags list necessary and pertinent information
- 11.3 Containers of products are identified by the part number and/or the internal lot control number / manufacturers lot control number prior to shipment or placing into stock.

12.0 MATERIAL REVIEW

- 12.1 The purpose of the material review is to determine the future use of any nonconforming raw material or parts.
- 12.2 In the case nonconforming material is received or produced by mistake the case will be brought to a Material Review Board. The board is to consist of the General Manager, Quality Control Manager, Production Manager, Engineering Department, Purchasing Department and a customer representative.
- 12.3 The basis for a material review shall be to determine a course of action for the discrepancy in question and the Material Review Board may suggest a corrective action.
- 12.4 In normal cases the decision would be; use as is, rework, return to vendor or scrap.
- 12.5 If the discrepancy in question is in violation of a customer requirement the decision of the review board must be approved by the customer and the decision must be in writing.
- 12.6 Until any such decision is made the parts or material will be on "hold" in a pre-designated area.
- 12.7 Material review personnel shall have the authority and responsibility to stop production when unsatisfactory corrective action measures are present.
- 12.8 Tooling & Assembly Solutions shall not delegate Material Review Board authority to sub-tier suppliers without customer approval.
- 12.9 Disposition of customer owned parts must be approved by the customer.

13.0 QUALITY CONTROL AUDIT

- 13.1 Components may conduct a periodic audit of the Quality Control Program, at their discretion and without prior notice.
- 13.2 Adequacy of procedures, Quality Control Documents, Inspection Procedures, Testing Procedures, Controls and Certifications shall be audited by an impartial team of members of management of Tooling & Assembly Solutions.

14.0 CORRECTIVE AND PREVENTIVE ACTION

- 14.1 Corrective action is taken to help assure nonconformances are resolved and permanent solutions are implemented. Corrective actions are issued, recorded and verified in accordance with documented procedures.
- 14.2 Preventive action is taken to assist management in continuous improvement efforts. Preventative actions are issued, recorded and verified in accordance with documented procedures.
- 14.3 Everyone in the organization is responsible for instituting, monitoring, or requesting corrective / preventive actions. Problems are evaluated for potential impact on production processes, safety, quality, performance, reliability and customer satisfaction. Sources of data and information used in the evaluation may come from failure analysis results, manufacturing operations, or customer feedback.
- 14.4 Problems are analyzed to determine whether immediate corrective action is required. Action may include production stoppage, shipping hold, stock purge, supplier hold, or product recall. Once immediate control action has been taken, the cause is analyzed to determine required corrective action. Short-term corrective actions may include customer notification, rework, or product screening. Long-term corrective actions may include product redesign or production process revision.
- 14.5 After the cause of the problem has been identified, measures are taken to prevent its recurrence. Nonconforming items are properly disposed of or corrected. The effects of these measures are audited to assure the desired goals are met and the permanent changes are in place, documented and communicated.
- 14.6 Preventive actions plans are created to address longer-term trends as represented by quality related data.

INDEX OF FORMS AND EXHIBITS

FORM ID	DESCRIPTION
Cover Letter	Part Information Sheet
QAF-01	Part Information Sheet
QAF-02	First Article Approval Form
QAF-03	Inspection Record
QAF-04	Deviation Request
QAF-05	Calibration Intervals
QAF-06	Shipping Document