

QUALITY ASSURANCE AND SYSTEMS INTEGRITY MANUAL
ANDREWS LASER WORKS CORPORATION
COVINGTON, KENTUCKY

VICE PRESIDENT / GENERAL MANAGER

DIRECTOR OF QUALITY

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SCOPE

The policy described in this Quality Assurance and Systems Integrity Manual complies with requirements of ISO 9001-2000 Standard and AS 9100B Aerospace Standard. The quality system requirements will focus on implementing contractual requirements for products supplied by Andrews Laser Works. This applies to all ALW employees and is endorsed by management.

The objective of the Andrews Laser Works Quality Management System is to prevent non-conformities, implement effective means to prevent reoccurrences, and continually strive to improve the results of all processes. The content in this SCOPE is directed toward customer expectations and quality needs.

QUALITY POLICY

Our goal is to satisfy our customers, clearly define and meet our operating requirements, and continuously improve our operations. The following policies guide us in achieving this goal:

The Three “**C**”s of Quality:

Conform to Requirements – clearly define and conform to the requirements at each and every step of our process.

Customer Satisfaction – Try to do better than the customer expects.

Continual Improvement – Always work to improve the process and the results.

The quality management system is fully described in our quality manual, operating procedures, work instructions and related documents, the requirements of which are followed by all employees at all times.

VP/ General Manager

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REVISION RECORD

Revisions to the Quality Assurance and Systems Integrity Manual will be the responsibility of the Director of Quality. The Vice President/General Manager in accordance with the document and data control procedures will approve revisions. The Director of Quality will process and send all approved changes through intercompany or external mail to all controlled Quality Assurance and Systems Integrity Manual holders. Each holder must sign the Systems Integrity Revision Record Change Notice and return it to the Director of Quality within a four-week period or their manual becomes non-controlled. The Director of Quality will ensure that the holder disposes of any obsolete documents, resulting from a revision.

Section/Page	Revised	Issue Date	Description
6.0/27	05/20/98	05/26/98	Added additional OAP (OAP 1000) per Customer Requirements.
Various Sections	07/01/98	07/06/98	Added additional information as required from comment presented from registrar.
7.0/27	07/30/98	07/30/98	Updated to reflect a broader interpretation of the standard.
6.0 / 27	8/26/98	8/31/98	Added additional OAP (OAP 628) per Customer Requirements.
4.1.2.4 / 15	9/7/00	9/7/00	Added the words (Andrews Laser Works of Mexico).
Orgn. Chart / 9	9/7/00	9/7/00	Added Andrews Laser Works of Mexico and John Grever to Organizational Chart.
ALW 0.1 (ALL)	02/07/01	02/07/01	Updated to ISO 9000-2000 & AS 9100A
ALW 0.1 (ALL)	7/25/01	07/25/01	Updated to ISO 9000-2000 & AS 9100A
ALW 0.1 (ALL)	07/09/03	07/09/03	Updated to ISO 9001-2000 & AS 9100A
ALW 0.1 (ALL)	07/15/03	07/15/03	Updated to ISO 9001-2000 & AS9100A
ALW 0.1 (ALL)	07/29/03	07/29/03	Updated to ISO 9001-2000 & AS9100A & Title change from Control to Assurance
ALW0.1 (ALL)	08/24/04	08/24/04	Updated to ISO 9001-2000 & AS9100 B & Title change from Control to Assurance

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CONTROLLED CIRCULATION LIST

The Director of Quality is responsible for the distribution and control of the Quality Assurance and Systems Integrity Manual.

All Quality Assurance and Systems Integrity Manuals will be either marked controlled or non-controlled on the cover page. Controlled copies will be identified by a serial number and this controlled circulation list. Non-controlled copies may only be issued by the Director of Quality and will not be revised once issued.

The Director of Quality shall maintain the master manual in his/her office.

COPY NO.

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1.0 SCOPE

1.1 General

The purpose of this Quality Assurance and Systems Integrity Manual is to present an outline of the documented Quality System that is in place, in order to provide proper assurance of quality and continuous improvement of Andrews Laser Works products, internal activities and applicable regulatory requirements.

Special care has been taken in the development of this manual to address the requirements of International Standard, ISO 9001-2000, as well as the Aerospace Standard AS 9100. This Quality Assurance and Systems Integrity Manual is published, distributed and maintained by the Quality function.

Revisions to this manual's content are made, when appropriate, due to changes in the Quality System or organizational structure. Revisions are approved by the Vice President/General Manager or designated representative. Additions, changes and deletions are made to controlled copies only. Uncontrolled copies are marked as such when issued.

Operating Procedures are developed by and for the customer in support of their satisfaction and Andrews Laser Works Quality Assurance and Systems Integrity Manual. These procedures define how the Quality System functions within the group. In addition, they identify the responsibility and authority within and between functional areas.

Each manager or a designated representative initiates and reviews Operating procedures assuring they are kept up-to-date to reflect current practice, and are being followed. Managers ensure that written procedures for their area;

- a) Direct actions to meet accepted requirements of their customers;
- b) Effect efficient operations within their areas.

The Quality function maintains a current master file of the Operating Procedures.

Work Instructions are developed, controlled and maintained by production manager in support of the Operating Procedures. They are indexed and located within department manuals, in the appropriate work areas.

Data is the systematic accumulation of information supporting Operating Procedures and Work Instructions. The data maintained in each functional area is analyzed for continuous improvement and customer satisfaction.

1.2 Application

All requirements of this International Standard are generic and are intended to be applicable to all organizations, regardless of type, size and product provided.

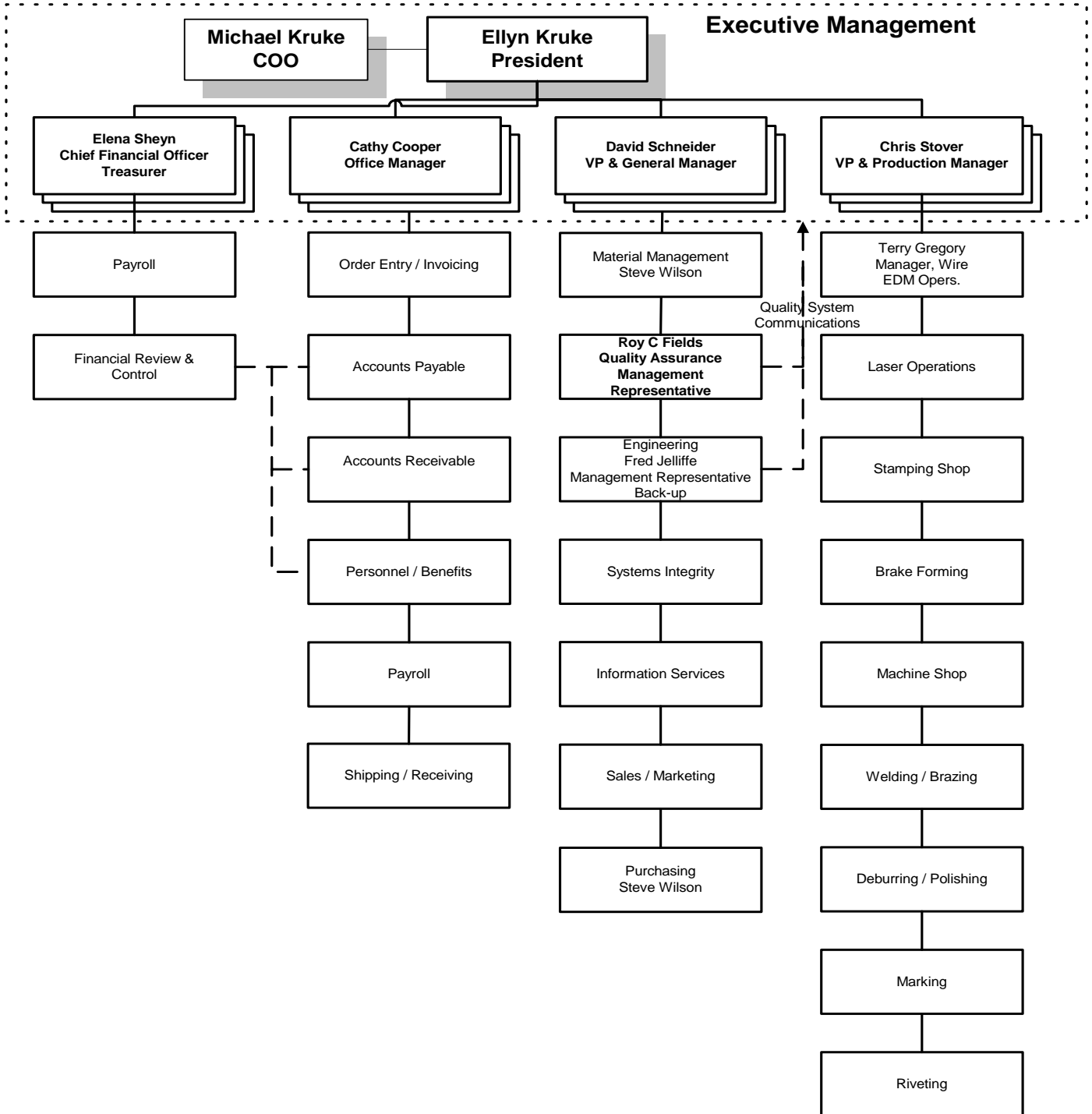
Where any requirement(s) of this International Standard cannot be applied due to the nature of an organization and its product, this can be considered for exclusion.

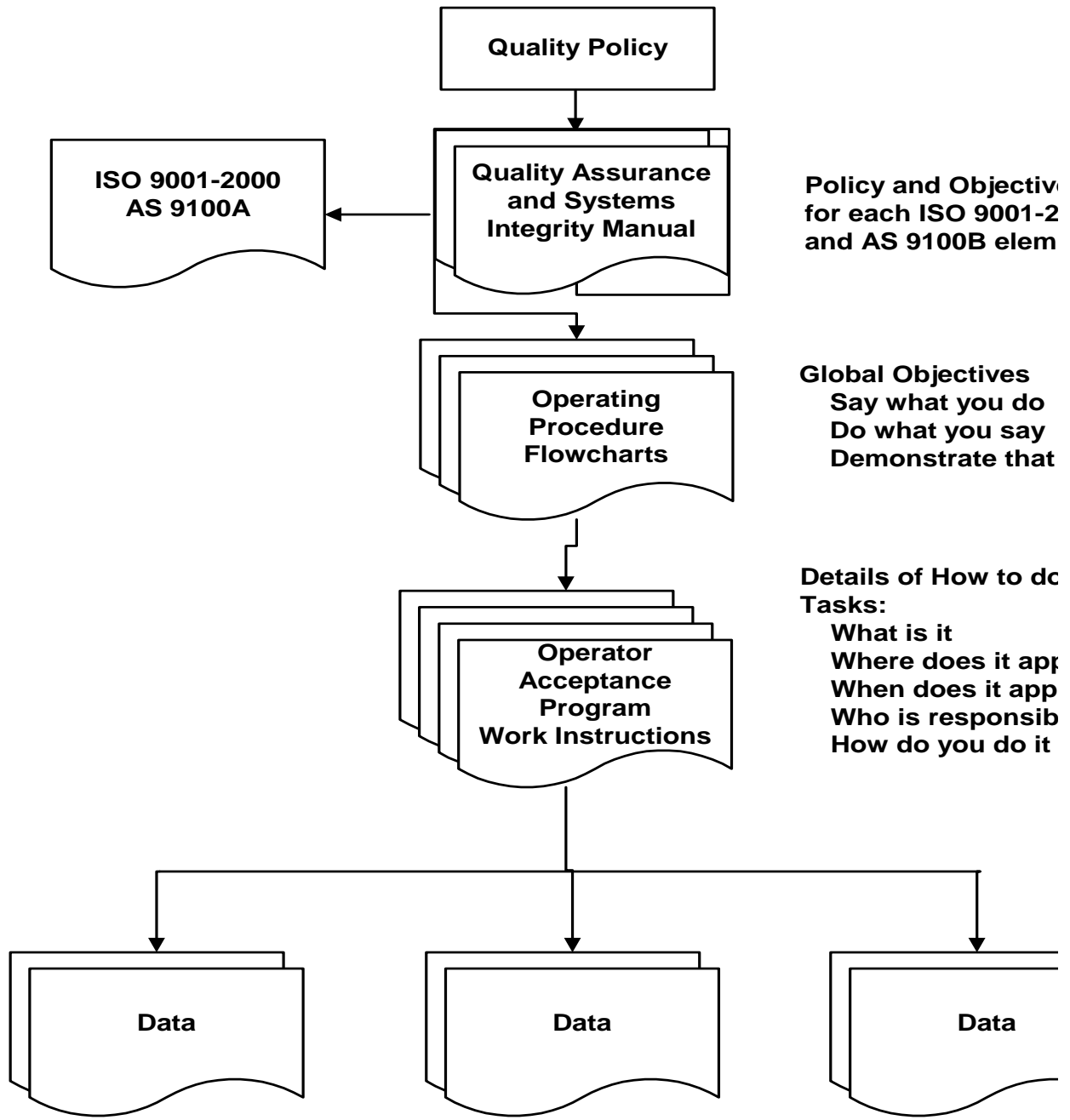
1.2 Continued

Where exclusions are made, claims of conformity to this International Standard are not acceptable unless these exclusions are limited to requirements within clause 7, and such exclusions do not affect the organization's ability, or responsibility, to provide product that meets customer and applicable regulatory requirements.

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Evidence That You Did It

2.0 Normative Reference

ISO 8402 Quality - Vocabulary

ISO 9001-2000 Quality Management Systems Requirements

ISO 10007 Quality Management- Guidelines for configuration management

ANSI/ISO/ASQ91-Q9001-2000 - American National Standard, Quality Systems - Model for Quality Assurance in Design/Development, Production, Installation, and Servicing

AS 9100B Aerospace Standard

ANSI/NCSL Z540-1-1994 Quality Assurance Requirement for Measuring Equipment

3.0 Terms and Definitions

Definitions and abbreviations used in this manual.

ALW – Andrews Laser Works

IM&TE – Inspection, Measuring and Test Equipment

Quality Assurance and Systems Integrity – The entirety of policy, Quality Assurance and Systems Integrity Manual, Operating Procedures, Work Instructions and data used to meet the requirement of ISO 9001-2000 and AS 9100 corporate objectives.

OP – Operating Procedure

RAM – Reliability and Maintainability

NIST – National Institute Standard Technology

OAP – Operator Acceptance Program

QC & SI – Quality Control and Systems Integrity

QIT – Quality Improvement Team

KC – Key Characteristics: The features of a material or part whose variation has a significant influence on product fit, performance, service life, or manufacturability.

WI- Work Instructions

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4.0 Quality Management Systems

4.1 General Requirements

Our Quality System OP 2 is based on a strategy of **Continual Improvement**, a process without end that requires the support and participation of **all employees**. This system addresses the development and production of our products, according to specified requirements. The policies and practices of this system have been developed and are maintained within our Quality Assurance and Systems Integrity Manual. Other Quality Systems requirements imposed by the applicable Regulatory Authorities shall be included or referenced in the Quality System documentation

The organization shall

- a) identify the processes needed for the quality management system and their application throughout the organization,(WI-12)
- b) determine the sequence and interaction of these processes,(WI-10)_
- c) determine criteria and methods needed to ensure that both the operation and control of these processes are effective,
- d) ensure the availability of resources and information necessary to support the operation and monitoring of these processes,
- e) monitor, measure and analyze these processes, and
- f) implement actions necessary to achieve planned results and continual improvement of these processes.

The items above are covered in our internal documents: OAP, OP, WI, Router Sequence, Customer B/P, Approved Vendors & Quality Clauses for Outside Operations.

When ALW has a process that is outsourced, controls are in place to assure conformance and control.(OP 6, OP 10-1, WI-2, ALW 4.6-0002 & ALW 4.6-0003)

4.2 Documentation Requirements

4.2.1 General

Representatives of each department and all functional areas develop, implement and maintain Operating Procedure(s) conforming to this Quality Assurance and Systems Integrity Manual, as applicable. The degree of detail in a procedure for a particular department and/or functional area corresponds to the technical complexity of the operations and the established requirements of the market. (OP5)

Individual functional areas will also develop, implement and maintain applicable Work Instructions and procedures, as appropriate, in support of this Quality Assurance and Systems Integrity Manual and Quality System Procedures.

These Quality System Procedures and Work Instructions will be available for review by Andrews Laser Works personnel as well as our customer and/or applicable regulatory agencies.

Ensure that quality system procedures are readily accessible to personnel who are responsible for performing work in conformance to requirements, and to customer and/or regulatory authorities representative.

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ALW's Quality System will be monitored by a series of quarterly Internal Quality Audits. The Audits will be performed to OP's, OAP's, and WI's that are in the Department Manual for that department and Quality Assurance and Systems Integrity Manual. Performed to (WI-12) Internal Audits

4.2.2 Quality manual

ALW's (Quality Assurance and Systems Integrity Manual) has been established to control and maintain all of Andrew's quality requirements, process controls, procedures, and work instructions. (OP2)

- a) the scope of the quality management system, including details of and justification for any exclusions
- b) the documented procedures established for the quality management system, or reference to them, and
- c) a description of the interaction between the processes of the quality management system.

4.2.3 Control of documents

Procedures are established and maintained for the control and maintenance of all documents and data that relate to the requirements of the quality system. This includes documents of any type that are both internal and external to ALW, when applicable. (OP5 & Master List)

4.2.3a Document and Data Approval and Issue

Controlled documents are reviewed and approved for adequacy by authorized personnel prior to issue. A Master List of all applicable documents will be used to identify current revision status and issue date. This control ensures that:

- a) Current issues of appropriate controlled documents are available at all locations where operations essential to the effective functioning of the quality system are performed; and (OP5)
- b) Obsolete controlled documents are promptly removed from all points of issue or use; and (OP5)
- c) Those obsolete documents retained for legal and/or knowledge-preservation purposes are suitably identified. (OP5)
- d) When customer furnished digital data is used for design, production, and/or inspection, the supplier shall establish system controls in accordance with customer requirements. (WI-8)

4.2.3b Document and Data Changes

Changes to the quality system documentation will be first reviewed for technical accuracy and then reviewed and approved by designated personnel and entered into the system according to documented procedures. Updates will be made to the Master List, Table of Contents and other documents in order to maintain a record of change effectivity, (more specifically: detail the revision status and issue date) .(Master List, ALW-4.5-0001 & OP5)

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4.2.3c Document Change Incorporation

ALW shall establish a process to ensure the timely review; distribution, implementation, and maintenance of all authorized and released drawings, standards, specifications, planning, and changes. The supplier shall maintain a record of change incorporation and, when required, shall coordinate these incorporations with the customer and/or regulatory authority .(OP5)

4.2.4 Control Of Records

Procedures are established and maintained to identify, collect, maintain, store, and make available quality records in order to demonstrate the effective operation of the Quality System. These records are maintained to demonstrate achievement of product and system quality during manufacturing and after delivery to the customer's plant. Disposition of all documents conforms to the company's retention policy.

Records are maintained for each product. These records are readily retrievable and suitably stored to prevent premature loss. Where agreed contractually, quality records are available for evaluation by the customer, customer representative, or regulatory agency for an agreed period. (OP16)

4.3 Configuration Management

ALW has a documented configuration management process appropriate to the product. Administration reviews contracts/PO's for rev level and is reviewed prior to issuing job to floor. Quality management will audit quarterly using the Configuration Control Audit form. (WI-12, WI-13 & OP 17)

5.0 Management Responsibility

5.1 Management Commitment

The Management at Andrews Laser Works has defined their commitment to quality through their quality policy, which is stated at the beginning of this manual. Management will ensure that this policy is communicated to all employees and that the ideas and objectives towards quality are well understood by all employees and shall meet customer, statutory and regulatory requirements. (OP1)

5.1.2 Management Review

The Vice President/General Manager and staff shall review the Quality System at a minimum of once per year or as needed to ensure continuing quality improvement and customer satisfaction. Records of these reviews, along with any planned changes will be made in accordance with the procedures of this manual. (OP1)

5.1.3 Process Performer

ALW having a quality assurance activity performed by an individual process owner (e.g..., operator, buyer, planner) shall have procedures that define the specific tasks and responsibilities that are authorized and

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the corresponding requirements and training necessary to perform those tasks to adhere to all quality objectives. (OP9-1 & WI-5)

5.1.4 Resources

It is the responsibility of the functional managers to provide adequate resources and provide trained personnel for performance of work and verification activities, including internal quality audits.

Procedures are established and maintained that identify verification activities such as test and monitoring of production and/or product and internal audits of the Quality System. (WI-5 + 12 & OP17 + 18)

5.2 Customer Focus

Before acceptance of an order (by mail, fax, or verbal), the contract will be reviewed to thoroughly understand and manage the customer's requirements and ensure their satisfaction. (OP3 & WI-3)

The review ensures that:

- a) The requirements are adequately defined and documented.
- b) Any requirements differing from those in the order are resolved; and
- c) ALW has the capability to meet those contractual requirements described.
- d) Risk associated with new technology and/or short delivery time scale has been evaluated.

5.3 Quality Policy

See Quality Policy on page 5 and Commitments in section 5.1

5.4 Planning

5.4.1 Quality Objectives and Management Systems Planning

This Quality Manual, Procedure (OP 2), Work Instruction (WI-10), Operator Acceptance Program, Router, and Customer Blue Prints defines how the company will meet its requirements for the quality of its products.

Preparation of routers, quality plans, and written instructions are reviewed and approved prior to use, and include but are not limited to, the identification and acquisition of controls, process, equipment, inspection & test requirements, resources, skills, tooling, etc.

All work is planned prior to the start of any job to ensure compatibility of all phases of production from design to final inspection and test, including unique state of the art measurements, particularly for key characteristics.

If customers request special requirements, other than existing standard processes or products, a router or written instructions for quality assurance purposes shall be generated.

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Written instructions may also be used to define the quality assurance controls for the development and introduction of any new processes or equipment.

Consideration has been given to the various aspects of ALW produced products from start to final testing to ensure a quality product. The identification of in-process verification points when adequate verification of conformance cannot be performed at a later stage of realization, will be recorded on the job router during in process manufacturing.

Records of products from raw material to delivery are maintained for future verification in Quality or Administration Departments.

Identification and selection of suppliers (subcontractors) are evaluated on their abilities to meet ALW's and their customer's quality requirements. Approved suppliers and subcontractors list is maintained in the computer and controlled by the Quality and Purchasing Departments.

If the customer has identified KC's, written instructions will be updated to reflect those controls.

The establishment of appropriate process controls and development of control plans where KC's have been identified.

The identification of material, processes, and services to support operation and maintenance of the product.

5.5 Responsibility, Authority and Communications

5.5.1 Responsibilities and Authority

The responsibility, authority and interrelation of all employees who manage, perform and verify work affecting both product quality and support activities are established in accordance with the ALW reporting relationships, as shown on the company's organizational chart (PG 10). Roles and responsibilities for all employees, who impact the quality of the product, are defined within training records and analysis documents, excluding executive management.

Procedures are established defining the functional authority given to those responsible for:

- a) Initiating action to prevent the occurrence of any nonconformance relating to product, process and quality system; (ALW 4.13-0003)
- b) Identifying and recording product, process and quality system problems; (ALW 4.5-0001 & OP 5.
- c) Initiating, recommending or providing solution to quality problems; (ALW 4.13-0003)
- d) Verifying the implementation of solutions; and (ALW 4.13-0003)
- e) Controlling further processing, delivery or installation of nonconforming product until the deficiency or unsatisfactory condition has been corrected (OAP 13)

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- f) The importance of meeting customer as well as statutory and regulatory requirements. (OP 9-1)

5.5.2 Management Representative

The Director of Quality has been appointed by the Management of ALW and assigned the authority and organizational freedom to resolve matters pertaining to quality and that the requirements of this Quality Assurance and Systems Integrity Manual are implemented and maintained. The Director of Quality will act as a liaison to executive management and external parties on the performance and relevant matters of the quality system. (OP 1 & Organizational Chart)

5.5.3 Internal Communication

QIT made up of various representatives from senior management, quality, and engineering. Primary responsibility is to promote ongoing improvement and to determine the need for statistical methods, corrective actions, and when necessary the disposition of nonconforming products. (OP2, OP5, OP17, OP18, ALW 4.13-0003 & ALW 4.5-0001)

5.6 Management Review

5.6.1 General

The QIT shall review ALW's Quality System at a minimum of once per year or as needed to ensure continuing quality improvement, adequacy, effectiveness and customer satisfaction. Records of these reviews, along with any planned changes or improvements will be made in accordance with the procedures of this manual and section 4.2.4. (OP 1)

5.6.2 Review Input

The input for management review shall include information on (ALW 4.17-0002, OP17, OP14, OP10-3, OP14, ALW 4.14-0002)

- a) audit results,
- b) customers feedback,(ex. ScoreCard)
- c) process performance and product conformity,
- d) status of preventative and corrective actions,
- e) follow-up actions from previous management reviews,
- f) changes that could affect the quality management system, and
- g) recommendations for improvement.

5.6.3 Review Output

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The output from the management review shall include any decisions and actions related to (OP1, OP2)

- a) improvement of the effectiveness of the quality management system and its processes,
- b) improvement of product related to customer requirements, and
- c) resource needs.

6.0 Resource Management

6.1 Provisions of Resources

ALW shall determine and provide the resources needed (OP1, OP2, & OP5 & OP9-1)

- a) to implement and maintain the quality management system and continually improve its effectiveness, and
- b) to enhance customer satisfaction by meeting or exceeding customer requirements.

6.2 Human Resources

6.2.1 General

ALW personnel performing work affecting product quality shall be competent on the basis of appropriate education, training, skills and experience. (OP18 , ALW 4.18-0001, ALW 4.18-0002 & WI-18)

6.2.2 Competence, awareness and training

Procedures are established to identify and provide for the training of all employees performing activities affecting quality. Employees performing specific assigned tasks are qualified on the basis of education, training and/or experience as required. Training will be an on-going process with evaluation and awareness of employee's activities and how they contribute to the achievement of the quality objectives. Records of training are maintained. (ALW 4.18-0002 & WI-5)

6.3 Infrastructure

ALW shall determine, provide and maintain all necessary equipment and processes needed to achieve conformity to product requirements. (OP 9-1 & OP 9-3) Infrastructure includes

- a) buildings, workspace, and associated utilities, such as electric, water, compressed air and chemical products,
- b) process equipment (both hardware and software), and
- c) supporting services (such as transport or communication).

6.4 Work Environment

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ALW shall determine and maintain a safe work environment needed to achieve product conformity requirements. These items may include temperature, humidity, lighting and cleanliness. (OP 9-1)

7.0 Product realization

7.1 Planning of product realization

Production and installation processes that directly affect quality are identified and planned to ensure that these processes are carried out under controlled conditions. Controlled conditions include: (OP5, OP9-1, OP9-3, OP10-2, OP11, OP15, WI-5, WI-6, WI-10)

- a) Documented Work Instructions defining the manner of production where the absence of such instructions would adversely affect quality;
- b) Use of suitable production equipment,
- c) Compliance with reference standards/codes, quality plans and/or documented procedures;
- d) Monitoring and control of suitable processes and product characteristics, including key characteristics where required by purchase order/ contract;
- e) The approval of processes and equipment, as appropriate;
- f) Criteria for workmanship shall be stipulated, to the greatest practicable extent, in written standards or by means of representative samples;
- g) Suitable maintenance of equipment to ensure continuing process capability to meet product specifications/requirements;
- h) Accountability for all product during manufacture, including part quantities, split orders, and nonconformities;
- i) Evidence that all manufacturing and inspection operations have been completed as planned, and/or as otherwise documented and authorized;

7.1.1 Production Documentation

Production operations shall be carried out in accordance with approved data. (WI-8, OP-5 & OP9-1)

- a) Drawings, parts list, process flow charts including inspection operations, production documents (e.g., manufacturing plans, traveler, router, work order, process cards); and inspection documents.
- b) A list of specific or non specific tools and numerical control (NC) machine programs;

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- c) Documents associated with specific tools enabling the tools to be designed, produced, validated, controlled, used and maintained;

7.1.2 Control of Production Process Changes

Persons required approving changes to production processes should be identified and authorized. (OP1, OP3 & OP5)

- a) ALW shall identify those changes, which require customer acceptance in accordance with contractual requirements prior to making any changes.
- b) Changes affecting processes, production equipment, tools and programs shall be documented on (ALW4.5-0001) Quality System Change Form and kept in the Quality System Change Log Book. It will be maintained in the Quality Department and will be reviewed by the Quality Improvement Team.
- c) The results of changes to production processes shall be assessed to confirm that the desired effect has been achieved without adverse effects to product quality.

7.1.3 Control of Production Equipment, tools, and Numerical Control (NC) Machine Programs:

Production equipment, tools, and programs shall be validated prior to use, maintained and inspected periodically according to documented procedures. Validation prior to production use shall include verification of the first article produced to the design data/specification. (OP8, OP9-3, WI-8 & OAP 927)

7.1.4 Control of Work Occasionally Performed Outside the Supplier's Facilities:

When planning to carryout work at a location other than its normal facilities, the supplier shall define the procedure to validate the location and to control the work. (OP6)

7.1.5 Tooling

Production tooling is controlled and maintained by outside resources, and then verified internally so as to ensure that the product meets design requirements. (OP9-3)

7.2 Customer-Related Processes

7.2.1 Determination of requirements related to the product

The Administration function has the responsibility and authority for contract review and the coordination of the activities involved (manufacturing & quality requirements, delivery, post delivery, statutory and regulatory requirements). This function will establish and maintain accurate and complete communications with ALW sales representatives, customers, and appropriate internal functional areas. The supplier shall also establish and maintain documented procedures for tender review and for the coordination of these activities. (OP3, WI-3 & OP15)

7.2.2 Review of requirements related to the product

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The Administration and/or Quality function is responsible to identify amendments to a contract and communicate the information to the appropriate functional areas. **NOTE: Contract review requirements shall also apply to contract amendments.** (OP3)

7.2.3 Customer communication

In addition to the above, ALW will maintain communications with the customer regarding inquiries of delivery, contracts or open orders, amendments and any complaints or feedback. Any changes or amendments will be recorded and maintained. (OP3 & OP5)

7.3 Design and development

ALW has no Design department. ALW is not responsible for design of the product being produced.(OP4)

7.4 Purchasing

7.4.1 Purchasing process

The Purchasing function has the responsibility and authority to ensure that purchased products, including those products obtained from customer-designated sources and subcontractors conform to specified and quality requirements. (OP6, ALW 4.6-0001, ALW 4.6-0002, ALW 4.6-0003 & ALW 4.6-0004)

Periodically the Purchasing and Quality Departments conducts supplier performance evaluations (including customer-approved special process sources), capability and quality system evaluations and measurement/tracking approaches that look at the quality, delivery, service and price performance of suppliers using form (Supplier Evaluation Checklist) File Name: SEC. Those suppliers found in nonconformance with specified requirements will be reviewed and it will be determined if disapproval is necessary. (WI-2)

An approved suppliers list is maintained in purchasing on the computer to identify supplier status.

7.4.2 Purchasing information

Purchasing documents shall contain data clearly describing the product ordered, including where applicable: (OP6, ALW 4.6-0004)

- a) The type, class, grade, or other precise identification;
- b) The title or other identification, and applicable issues do specifications, drawings, process requirements, inspection instructions, and other relevant technical data, including requirements for approval or qualification of product, procedures, process equipment and personnel;
- c) The title, number, and issue of the quality system standard to be applied:
- d) Design, test, examination, inspection, and customer acceptance requirements and any related instructions and requirements:

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- e) Right of access by the purchaser, their customer and regulatory authorities to all facilities in the order and all applicable quality records;
- f) Requirements for test specimens (production method, number, storage conditions etc.) design approval, inspection, investigation or auditing;
- g) Requirements relative to the notification of anomalies, changes in definition and the approval of their processing;
- h) Requirements to flow down to sub tier suppliers the applicable requirements in the purchasing documents, including KC's where required;

ALW shall review and approve purchasing documents for adequacy of the specified requirements prior to release.

7.4.3 Verification of purchased product

ALW is required to provide evidence that products shipped conform to the purchasing specifications and those requirements regulated by ALW's quality system. When contract driven, the ALW and/or the customer have the right to verify purchased materials at the supplier's facility and provide right of entry to any place necessary to determine and verify the quality of work, records, and/or materials. When necessary, ALW may delegate product verification to a supplier (subcontractor) provided the acceptance criteria are clearly defined. Such verification and/or delegation will not relieve ALW of normal inspection and test requirements. (OP10-1 & OAP 940)

Customers' standard and unique characteristics not verifiable upon receipt shall be clearly defined in purchasing documentation to ensure a full understanding of quality system requirements.

ALW will ensure that the subcontractor adequately controls characteristics not verifiable upon receipt and that the requirements for key characteristics are flowed down if the supplier subcontracts a process involving key characteristics.

7.5 Production and Service Provision

7.5.1 Control of production and service provision

In the case of special processes where inspection cannot be verified during production, the processes will be carried out by qualified operators and/or will be monitored to ensure that the specified requirements are met. The customer prior to processing or subcontracting to an approved source will qualify special processes. Records will be maintained on special processes, including the equipment and personnel in use, as appropriate. (OP6)

Andrews Laser Works is responsible for the requirements of servicing, if and when it becomes a requirement. (OP19)

7.5.2 Validation of processes for production and service provision

When production operations call for special processes, the following requirements shall apply: the special processes to be implemented shall be identified and qualified prior to use; the supplier shall control

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applicable aspects of special processes, as defined by the process specifications, this includes special process changes; the supplier shall define the significant operations and parameters in the process to be controlled during production.

Andrews Laser Works is responsible for the requirements of servicing, if and when it becomes a requirement.

7.5.3 Identification and traceability

Procedures are established and maintained for identifying product from receiving of raw material through all stages of production and delivery. (OP8)

Where, and to the extent that, traceability is a specified requirement, individual products have a unique identification in accordance with documented procedures.

According to the level of traceability required by contract, regulatory, or other established requirement, the supplier's system shall provide for:

- a) Identification to be maintained throughout the product life;(Router)
- b) All the products manufactured from the same batch of raw material or from the same manufacturing batch to be traced, as well as the destination (delivery, scrap) of all products of the same batch;(Router)
- c) For an assembly, the identity of its components and those of the next higher assembly to be traced;(Router)
- d) For a given product, a sequential record of its production (manufacture, assembly, inspection) to be retrieved.(Router)

ALW shall maintain the identification of the configuration of the product in order to identify any differences between the actual configuration and the agreed configuration.

Records, which give evidence that the product has passed inspection and/or was tested within defined acceptance criteria, are maintained in accordance with documented procedures. Records will identify personnel responsible for release of products and products that have first production article inspection and test requirements.(Router & First Article)

Actual test results data when required by specification or acceptance test plan will be shown on test records. Where required to demonstrate product qualification the supplier shall ensure that quality records provide evidence that the product meets the defined requirements.(Router Quality Plan & OAP Acceptance Matrix)

The inspection and test status of product is identified by suitable means, indicating the conformance or nonconformance of product with regard to inspection and test performed. The identification of inspection and test status is maintained, as necessary, throughout production to ensure that only product which has passed the required inspections and tests [or released under an authorized concession] is used.(OP9-1)

Records shall identify personnel authorized to verify, certify, and release products.(Stamp Control Log)

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Records and authority media, such as (e.g., stamps, electronic passwords) are controlled and used to ensure the identification of the inspection authority responsible for release of conforming product.

7.5.4 Customer property

ALW will ensure the all customer-supplied product is identified as such upon receipt. The product shall be inspected prior to used, to ensure that no obvious damage has occurred during transit, and the required quantity has been delivered. Such product shall be suitably identified to ensure it is used for the intended purpose and to maintain any trace ability requirements. If the product is not suitable for the intended use, the defect is recorded and the customer shall be informed. The customer shall agree to appropriate disposition action. (OP7 & WI-11)

7.5.5 Preservation of Product

Procedures are established and maintained that document the handling, storage, packaging, preservation and delivery of product as well as provisions for the prevention, detection, and removal of foreign objects. (OP15)

7.5.5.1 Handling

Methods and means of handling that prevent damage or deterioration are provided. (OP15)

7.5.5.2 Storage

Storage areas or stock rooms are provided to prevent damage or deterioration of product pending use or delivery. Methods of receipt and dispatch follow documented procedures. The condition of product in stock is assessed at appropriate intervals in order to detect deterioration, if applicable. (OP15)

7.5.5.3 Packaging

Packing, marking, and labeling processes including safety warnings are controlled to the extent necessary to ensure conformance to specified requirements. (OP15 & OP9-2)

7.5.5.4 Preservation

Appropriate methods for preservation and segregation of product are applied when the product is under the control of ALW. (OP15)

7.5.5.5 Delivery

Arrangements are made for the protection of the product quality after final inspection and test. Where contractually specified, this protection is extended to include delivery to destination. (OP15 & OP9-2)

ALW shall ensure that the accompanying documents for the product are present at delivery as specified in the contract/order and are protected against loss and deterioration.

7.6 Control and monitoring of measuring devices

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Documented procedures are established and maintained to control, calibrate and maintain inspection, measuring and test equipment (IM&TE) used to demonstrate conformance of product to specified requirements. IM&TE include all types of devices used by ALW or subcontractor personnel to verify materials, products, processes, or other IM&TE. Further this includes tooling used as media of inspection, test hardware, test software, automated test equipment; plotters used to produce inspection media, and personally owned equipment. Equipment will be used in a manner, which ensures that the measurement uncertainty is known and is consistent with the required measurement capability. (OP11)

Where test hardware (e.g., jigs, fixtures, templates) or test software serve as suitable forms of inspection, they are checked to prove that they are capable of verifying the acceptability of product prior to release during production. These forms of inspection are certified at prescribed intervals.

Documentation is provided for calibration performed in-house. When calibration is performed by an outside agency certification must be traceable to N.I.S.T., a certificate of calibration detailing the standard achieved and traceability to recognized standards is required of the outside agency. Evidence of this technical data will be made available when required by the customer. The Quality Assurance Department has the responsibility of maintaining all calibration records and scheduling of all calibration requirements on all IM&TE in-house.

- a) Determines the measurement to be made and the accuracy required, and selects the appropriate IM&TE;
- b) Identifies all IM&TE and ensures that they are calibrated against internationally or nationally recognized standards. Where no such standards exist, the basis used for calibration will be documented. A list of all IM&TE, including where appropriate, test advices and tools supplied by the customer.
- c) Defines the information in Calibration reports. This information includes, but not limited to: equipment type and identification, location, calibration dates, type of measurement, accuracy requirements, prescribed intervals, and acceptance criteria;
- d) Defines the calibration status, which is displayed on all inspection IM&TE;
- e) Identifies the maintenance of Calibration records for IM&TE;
- f) Documents the procedure for when IM&TE are found to be out of calibration. Including, that IM&TE will be removed and/or identified so they are not used. Previous results will be reviewed and compared to current results. Records will be updated to reflect status and/or disposition of the equipment accordingly. When the assessment indicates that the product may be nonconforming, disposition the nonconformance.
- g) Ensures that calibration checks on IM&TE will be performed in an appropriate environment;
- h) Ensures the handling, preservation and storage of IM&TE will be conducted to ensure that the accuracy of the equipment is maintained; and
- i) Ensures that test facilities, including both test hardware and test software, will be preserved from adjustment, which would invalidate the calibration settings;

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- j) Define the method for recall of measuring devices that require calibration.

8.0 Measurement, Analysis and Improvement

8.1 General

Where appropriate, operational areas have procedures, which identify the need for statistical techniques required for establishing, controlling, and verifying process capability, and product characteristics. (OP10-3 & OP12)

The implementation and control of the application of statistical techniques identified is maintained in documented procedures. Where product statistical testing is agreed contractually, the requirement is performed and records maintained.

According to the nature of the product and depending on the criticality and the specified requirements, these statistical techniques may be used to support:

- a) Design verification (e.g., reliability, maintainability, and safety).
- b) Process control.
- c) Selection and inspection of key characteristics.
- d) Process capability measurements.
- e) Statistical process control.
- f) Design of experiment.
- g) Inspection: matching sampling rate to the criticality of the product and to the process capability.
- h) Quality management: use of statistical techniques to determine required improvement activities.
- i) Failure mode and effect analysis.

Sampling inspection used as a means for product acceptance will be statistically valid and appropriate for use. The plan will preclude the acceptance of known defects in the lot.

8.2 Monitoring and measurement

8.2.1 Customer satisfaction

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ALW will monitor and evaluate monthly SUPPLIER SCORECARD REPORTS for QUALITY, DELIVERY and RESPONSIVENESS. (OP14)

8.2.2 Internal audit

Internal audits of the Quality System are made to determine its effectiveness. Frequencies of audits are determined by the status and performance of the activities and at a minimum will be completed once a quarter. Procedures are established for these audits and subsequent follow-up actions. Results of internal audits are reviewed with functional area management and presented at the management review. Timely corrective action on deficiencies is taken. (OP17 & WI-12)

ALW shall conduct internal quality audits that assess compliance to their quality system and the requirements of ISO 9001-2000 & AS 9100. A flow down of the requirements from this document through the supplier quality manual to the working-level procedures must be shown. Detailed tools and techniques will be developed such as check sheets, process flowcharts, or any similar method to support audit of the procedural requirements. The acceptability of the selected tools will be measured against the effectiveness of the internal audit process and overall supplier performance.

NOTE: Personnel carrying out these internal audits have received appropriate training.

8.2.3 Monitoring and measurement of processes

ALW will apply suitable methods for monitoring and measurement of the quality management system processes. These methods shall demonstrate the ability of the process to achieve planned results. When planned results are not achieved, correction and corrective action shall be taken, as appropriate, to ensure conformity of the product.. (OP1 & OP2)

8.2.4 Monitoring and measurement of product

All processes have sufficient controls to ensure that procedures for inspection and testing are met in order to verify specified requirements. Operators, inspectors and other internal qualified personnel will be responsible for the completion of inspection activities, according to documented procedures. (OP9-1, OP10-2, OP10-3 & OP16)

The resources and methods to be implemented, and methods of recording the results, shall include identification of authorized personnel, limits of authorization, training and qualification requirements.

Inspection documentation will be maintained and controlled by the supplier. This may be part of the manufacturing documentation.

- a) Criteria for acceptance and rejection
- b) Where in the sequence inspection and testing operations are performed
- c) Documents recording inspection results
- d) Identification of production inspection instruments

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- e) Documents associated with specific inspection instruments enabling them to be designed, produced, validated, controlled, used and maintained.

When ALW subcontracts inspection or test activities, the supplier shall control the subcontracted activity consistent with the requirements.

Incoming material or product is not used or processed until it has been inspected or otherwise verified as conforming to specified requirements, unless released for urgent production purposes. Verification is in accordance with documented procedures and completed to the full extent unless customer evidence of conformance is provided. Where customer conformance is used as a means of inspection verification of conformance will take place upon receipt.

Where incoming material or product is released for urgent production purposes, it is positively identified and recorded in order to permit immediate recall and replacement in event nonconformances are found. Material that is released for urgent production is only approved and released by the QC & SI department.

When certification test reports are utilized to accept material, the supplier shall assure that data in said test reports are acceptable per applicable specifications. The supplier shall periodically validate test reports.

In-process inspection and testing is performed, as required, in accordance with documented procedures. Conformance to in-process requirements is achieved by means of process monitoring and control methods.

Material or product requiring inspection is not advanced to the next process step until the necessary inspection and/or test has been performed.

Nonconforming product is identified as such.

Final inspection and testing procedures require that all specified inspection and tests, whether upon receipt of product or in process, be carried out and that related data meets specified requirements. All final inspection and testing are carried out in accordance with documented procedures in order to complete the evidence of conformance of the finished product to the specified requirements.

No product is shipped until all activities specified in the documented procedures or applicable contract have been satisfactorily completed. Associated data and documents are available upon authorized request or to meet contractual agreements.

ALW's system shall provide a process, as appropriate, for the inspection, verification, and documentation of the first article inspection report.

Retention of the first article inspection documentation is required and will include a list of the characteristics required by the design data and any required tolerances, the actual results, and when testing is required, the results of the tests. First articles will be update after each production process change and configuration change.

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8.3 Control of Nonconforming Product

All nonconforming products, including those returned from the customer, are controlled and clearly tagged and/or marked to prevent their inadvertent use or shipment. Identification will include part number and reason for rejection. Products found nonconforming will be segregated until they are reviewed and disposition is determined. Any in-process nonconformity will be considered a “nonconformance” and validated to help maintain product conformance. (OP13)

As necessary, notification of nonconforming product will be given to the following: internal personnel, customers, distributors and government agencies.

The term “ nonconforming product “ includes nonconforming product returned from a customer.

Nonconforming product is reviewed in accordance with documented procedures. It may be reworked to meet specified requirements, accepted with or without repair by concession, or scrapped.

NOTE: Products are never dispositioned “Use As Is” or “Regarded for Alternative Applications”.

Where required by the contract, the proposed use or repair of nonconforming product is reported for concession to the customer or representative. The description of accepted nonconformity, and of repairs, is recorded to denote the actual condition.

Repaired and reworked product is re-inspected in accordance with documented procedures. Scrap material shall be conspicuously and permanently marked, or destroyed when discarded.

The customer will be notified immediately upon discovery or receive of nonconforming product or material. A clear description of the nonconformance, which includes as necessary parts affected, customer and/or supplier part number, quantity, and dates delivered. All nonconforming notifications will be kept in the Job Folder.

The customer has soul MRB Authority.

8.4 Analysis of Data

ALW shall determine, collect and analyze appropriate data to demonstrate the suitability and effectiveness of the quality management system and to evaluate where continual improvement of the effectiveness of the quality management system can be made. This shall include data generated as a result of monitoring and measurement and from other relevant sources. QIT meeting addresses these issues. (OP1 & OP20)

The analysis of data shall provide information relating to

- a) customer satisfaction,
- b) conformity to product requirements,
- c) characteristics and trends of processes and products including opportunities for preventive action, and
- d) suppliers

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8.5 Improvement

8.5.1 Continual Improvement

ALW shall continually improve the effectiveness of the quality management system through the use of the quality policy, quality objectives, audit results, analysis of data, corrective and preventive actions and management review. (OP1, OP2, OP17 & OP18)

8.5.2 Corrective Action

Procedures are established and maintained that document the process for implementing corrective and preventive action. Actions suggested to be taken to eliminate the cause of actual or potential nonconformities would be reviewed beforehand regarding their appropriateness to the magnitude of the problem. (OP14 & ALW 4.14-0004)

Any corrective or preventive actions that require changes to documentation will be handled in accordance with document and data control procedures (Quality System Change Form) ALW 4.5-0001.

The procedures for corrective action include:

- a) The effective handling of customer complaints and reports of product nonconformities;
- b) Investigation of the root cause of nonconformities relating to products, processes and the quality system and recording the results of the investigation;
- c) Determination of the corrective action needed to eliminate the cause of nonconformities;
- d) Applying verification controls, when appropriate, to ensure corrective actions are taken and that they are effective.
- e) Flow down of the corrective action requirement to a subcontractor, when it is determined that the subcontractor is responsible for the root cause.
- f) Specific actions where timely and/or effective corrective actions are not achieved. The Quality Improvement Team will monitor all Corrective Actions for timely and effective responds. If this is not achieved, the QIT will evaluate the CA with the proper personnel involved. The CA will be reissued, if CA is not accepted.
- g) All Corrective Actions (Complete or Incomplete) are kept in the Quality Department. They will be kept in numerical order in the Corrective Action Log Book.

8.5.3 Preventive Action

The procedures for preventive action include (OP14)

- a) The use of appropriate sources of information such as processes and work operations, which affect product quality, audit results, quality records, and customer complaints to detect, analyze and eliminate potential causes of nonconformities.
- b) Determination of the steps needed to deal with any problem requiring preventive action using (ALW4.14-0006) Preventative Action Report.
- c) Initiation of preventive action and the application of verification controls, when appropriate, to ensure that it is effective. Quality Improvement Team will monitor all Preventative Actions for timely and effective responds.
- d) Ensuring that relevant information on actions taken is submitted for QIT review.
- e) All Preventative Actions (Complete or Incomplete) are kept in the Quality Department. They will be kept in numerical order in the Preventative Action Log Book.

9.0 List Of Procedures

OP 1	Management Responsibility
OP 2	Quality System
OP 3	Contract Review
OP 4	Design Control
OP 5	Document and Data Control
OP 6	Purchasing
OP 7	Control of Customer Supplied Product
OP 8	Product Identification and Traceability
OP 9-1	Process Control
OP 9-2	Shipping
OP 9-3	Maintenance and Tooling
OP 10-1	Receiving Inspection & Testing
OP 10-2	In-process Inspection & Testing
OP 10-3	Final Inspection & Testing
OP 11	Control of Inspection, Measuring and Test Equipment
OP 12	Inspection and Test Status
OP 13	Control of Nonconforming Product
OP 14	Corrective and Preventive Action
OP 15	Handling, Storage, Packaging, Preservation, & Delivery
OP 16	Control of Quality Records
OP 17	Internal Quality Audits
OP 18	Training
OP 19	Servicing
OP 20	Statistical Techniques

10.0 Work Instructions and Operator Acceptance Program

WI-2	Supplier Evaluation Process
WI-3	Contracts
WI-4	Split-Offs
WI-5	OAP-Procedure for Certified Operators
WI-6	Using Routers / Quality Plan / In-process Inspection
WI-7	Creating Shipping Labels
WI-8	Auto CAD Electronic Data Control
WI-9	Control and Issuance of Stamps
WI-10	Scheduling, Pre-production and Committing Work to Production
WI-11	Customer/Government Furnished Materials/Tooling
WI-12	Internal Quality Audits
WI-13	Configuration Management
OAP 130	Laser Cut Flat Pattern
WI-130A	Laser Qualification
WI-130B	Laser Maintenance (MK II 4000 Watt)
W1-30C	Laser Maintenance (X-48 1500 Watt)
OAP 175	Pierce and Blank
OAP 235	Form-Press Brake
OAP 325	Machine Shop Operation
OAP 423	EDM Technician
WI-423A	EDM Qualification
OAP 575	CNC Lathe
OAP 600	Brazing
OAP 625	Weld (Gas Shielded Tungsten Arc)
WI-625A	Welder Qualification Procedure
WI-625B	Weld Joint Qualification
OAP 650	Ream & Countersink
OAP 726	Tumble Deburr
OAP 750	FPI
WI-750A	FPI (Training and Qualification Procedure)
WI-750B	FPI (Known Defect Test Panel Requirements)
OAP 827	Marking Electrochemical Etch
OAP 874	Installing Inserts
OAP 875	Rivet
OAP 879	Installing Swage Nuts
OAP 925	Shipping
OAP 927	First Article Inspection
OAP 940	Receiving
WI-1000	Customer Source Delegation (Honeywell)
WI-1001	Customer Source Delegation (Rolls-Royce)

11.0 Appendix – Miscellaneous

- a. ISO 9001-2000
- b. AS 9100 Rev B
- c. NADCAP (FPI)
- d. NADCAP (WELDING)
- e. LASER CUTTING (GEAE APPROVED)
- f. EDM (GEAE APPROVED)
- g. FPI (GEAE APPROVED)
- h. WELDING (GEAE APPROVED)