
Quality Manual

FMC Measurement Solutions

Corpus Christi Operation

Corpus Christi, Texas

FMC EnergySystems
FMC Measurement Solutions

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0.0 Management Preface

FMC Measurement Solutions, Houston, Texas, USA is a subsidiary of FMC Technologies, Inc. The operations and locations named herein are subsidiaries of FMC Measurement Solutions.

FMC Measurement Solutions is a worldwide leading manufacturer of liquid and gas flow meters, electronic and mechanical metering accessories, and custom-designed measuring systems for custody transfer applications, product distribution, and process control.

The quality of our products is a cornerstone of our success, upholding both the reputation and the existence of our company. We, therefore, continuously strive to provide our customers products and services meeting every expectation.

The management of FMC Measurement Solutions and its subsidiaries accept the responsibility for, and the commitment to, the Quality Policy as described in this manual, as well as the responsibility for its implementation at all levels within the organization.



Richard Alabaster
Vice President & General Manager,
Corpus Christi Operation
Corpus Christi, Texas, USA

September 1, 2004

Date



Wade Williams
Operations Manager,
Corpus Christi Operation

September 1, 2004

Date

1.0 Introduction

This Quality Manual describes the quality system in effect at FMC Measurement Solutions. Its use is required along with all books of our ISO 9001:2000 Quality Assurance Documentation at the Corpus Christi Operation in Corpus Christi, Texas USA.

1.1 Foreword

It is a well-understood fact within FMC Measurement Solutions and its subsidiaries that customers are both internal and external. External customers are the people and companies that receive goods and services from us. Internal customers are people, departments, or groups who receive work output of others within the company (whether it is hardware, product, data, paperwork, etc.). Every individual in the company produces output that is used by someone else in or outside the organization, therefore everyone in the organization has customers.

This manual describes the mechanisms used to ensure that our customers are provided with products and services that fulfill his or her expectations. It defines a major portion of the continuous improvement process being utilized by the operations named herein.

The quality system described herein has been designed to comply with the requirements of the ISO 9001:2000 Quality System Standard.

1.2 Quality Policy

As a manufacturer of world-renowned flow meters and equipment designed and manufactured for accuracy, durability, and precise control, we strive diligently to remain the world's leader. Therefore FMC Measurement Solutions is committed to quality. Products and services must meet the standards expected by our customers. Products and services must meet safety and regulatory standards. We are always searching for better ways to meet our customers needs.

FMC Measurement Solutions requires the commitment and participation of all members of the organization to achieve desired quality and takes all measures necessary to ensure that its corporate quality policy is understood and maintained:

FMC Measurement Solutions is committed to compliance and continued improvement of the quality management system in order to provide superior, competitive products and services to our customers and associates on time, every time.

Scope: Design, Service, Project Management and Integration of Fluid Measuring Systems for the Petroleum and Industrial Marketplace.

1.3 Authorization and Control of This Manual

This manual and all subsequent changes must be authorized by the Operation Managers of each operation listed in the introduction.

A document number shall be assigned to this manual, and revisions indicated by a revision number and date as described in Erie Operations Procedure PP-MP-04.XX. Additions or changes to the manual, other than minor typographical changes, shall be identified by the use of gray shading. Deletions shall be indicated with a shaded X

1.4 Application

The quality system shall apply to all aspects of marketing, design, development, manufacturing, purchasing, testing, and servicing of deliverable product.

1.5 Implementation

Implementation of the quality system is achieved by compliance with this manual, subsequent quality procedures and other documents such as individual quality plans, test documents, etc. A master list or index shall be maintained of specific quality procedures utilized to implement the requirements of this manual at each location, and is considered a part of the manual.

1.6 Control of Documents

The purpose of this section is to define and establish the requirements for document creation, approval, issue and change.

1.7 Document Creation and Approval

The creation of documents that are essential to the quality of product and/or service shall be controlled via documented procedures. Documents shall include unique identifiers and revision status. All such information shall be reviewed and approved for adequacy by authorized personnel prior to issue.

1.8 Document Issue

Written procedures shall be maintained that ensure documents are available where they are needed, and that obsolete documents are promptly removed from these areas and destroyed, or identified in such a manner that would prevent unintended use.

1.9 Document Changes or Modifications

Documented procedures shall be established and maintained that control changes or modifications to documents. Authority to review and approve documents shall be defined by procedure. Personnel designated to review or approve changes to documents shall have access to background information on which to base their review and approval.

Standard drawing practices shall be established that shall, wherever practical, identify the nature of the change in the document or appropriate attachments.

Procedures shall be established that identify current document revisions in order to preclude the use of obsolete or non-applicable drawings or documents. Identification methods may include a master list, master file, or other means that allow ready access to revision information.

Procedures shall be established and documented to control standards and documents from external sources used in design or manufacture of deliverable products. Examples include material standards for raw material, engineering design standards from organizations such as ASME, ANSI, IEEE, DIN, ISO, EN Standards, EC Directives, etc. used to design products, quality system standards such as ISO 9001:2000, etc.

1.10 Control of Records

This section describes the requirements for identification, collection, storage, retention and availability of quality records.

1.11 Identification of Quality Records

Quality records shall be identified per documented procedures, process specifications, drawings, or other supporting documentation within the quality management system. Examples of quality records include: this manual, written procedures and work instructions, supplier evaluations, material certificates, routers or quality plans, travelers, equipment calibration records, meter calibration records, etc.

1.12 Collection of Records

Record collection shall be performed per established procedures. Unless otherwise specified, it shall be the department supervisor or manager's responsibility to ensure that records are collected in a timely and efficient manner. All quality records shall be legible and identifiable to the product or process involved.

1.13 Storage and Retention of Records

Records shall be stored in a logical, orderly manner. They shall be readily retrievable, and stored in an environment that ensures minimal deterioration and damage, and prevents loss. Retention times shall be established and documented. Record retention requirements of EU Directives shall be included in respective procedures.

1.14 Record Availability

Where contractually required by the customer or approval or code agencies, records shall be made available for inspection and evaluation by the customer, customer's representative, or agency representative.

2.0 Management Responsibility

2.1 General Requirements

The purpose of this section is to establish that overall responsibility for the quality of products and services rests with the division manager, but that all employees are responsible for the quality of their own output.

The Liquid Products Manager, in conjunction with his staff, sets the quality policy and objectives. The General or Operations Manager at each location selects the quality management representative and reviews the quality management system for adequacy at his or her location. Inputs to the management review and planning processes include both customer and legal requirements.

2.2 Customer Requirements

Management shall ensure that customer needs and expectations are determined and converted into requirements with the aim of achieving customer satisfaction. Management shall ensure that these requirements are fully understood and met.

2.3 *Planning*

2.3.1 *Objectives*

The Operation shall establish quality objectives for each relevant function and level within the organization. The quality objectives shall be consistent with the quality policy and the commitment to continual improvement. Quality objectives shall include those needed to meet requirements for products and/or services.

2.3.2 *Quality Planning*

The Operation shall identify and plan the activities and resources needed to achieve quality objectives. This planning shall be consistent with other requirements of the quality management system and the results shall be documented.

Planning shall cover:

- the processes required in the quality management system
- the realization processes and resources needed, identifying key quality characteristics at different stages, to achieve the desired results
- the verification activities, criteria for acceptability, and the quality records needed
- Requirements of approval and code agencies (e.g. notified bodies)

2.4 *Responsibility and Authority*

It shall be the responsibility of each and every employee to perform work that meets all quality requirements and standards set forth by the customer, this manual, and subsequent documents to the best of his or her ability.

The responsibility, authority, and interrelation of personnel shall be defined and documented, either in procedures required by this manual, or by some other controlled manner.

2.5 *Management Representative*

A member of management shall be appointed by the general or operations manager in each location to implement the quality system at that location, and assure continual improvements thereof.

It shall be the responsibility of that person to ensure the quality system is complete, implemented, and maintained. It shall also be that person's responsibility to report at least annually to management on the status of the quality system, including both current performance and any necessary improvements.

He shall have the authority and organizational freedom to: identify quality problems; initiate, recommend, and provide solutions to these problems; control further processing, delivery, or installation of nonconforming product until such time as the deficiency is resolved; ensure the awareness of customer requirements is promoted throughout the organization.

2.6 *Internal Communication*

Top management at each location shall establish and maintain channels for internal communication between various levels and functions regarding the quality management system and its effectiveness. Examples of communication channels include: management-led discussions in work areas, team briefings, recognition of achievements, poster boards, in-house newsletters, and employee suggestion or feedback procedures.

2.7 *Management Review*

The Operation shall hold a management review meeting, once each year at a minimum, to review the quality management system. The review shall include opportunities for improvement of the system, quality policy, and quality objectives. The meeting shall be chaired by the Operation Manager of each location. Reviews shall include:

- Prior Review Action Assignments
- Internal Audits
- External Audits
- Customer Feedback
- Process Performance/Product Conformity
- Preventive and Corrective Actions
- Proposed Changes to the Quality System
- Recommendations for Improvement

Records of reviews shall be documented, and shall include applicable decisions with regard to improvement of the quality system, procedures, processes, or products, as well as resource requirements as a result of those decisions.

3.0 Resource Management

3.1 General Requirements

The organization shall determine and provide in a timely manner, the resources needed to establish and maintain the quality management system. This includes the functions of all activities covered in the quality management system, e.g. manufacturing, purchasing, design, etc. Resources will include human resources, information, infrastructure, and the work environment.

3.2 Human Resources

3.2.1 Assignment of Personnel

The Operation shall assign personnel to ensure that those who have responsibilities defined in the quality management system are competent on the basis of applicable education, training, skills and experience.

3.2.2 Competence, Training, Qualification and Awareness

Procedures for identifying the training needs of new employees, employees being transferred to different job functions, skill maintenance of existing employees, or necessary skill increase required by new processes, machinery, etc., shall be established and maintained either as separate procedures, or incorporated within other procedures, and shall include follow up activities to evaluate the effectiveness of training.

Operator qualification criteria will be identified for operations affecting product quality.

Records of qualification shall be maintained in the form of personnel resumes, applications for employment, internal employee evaluations, certificates of completion of specific training or courses, or other methods as applicable.

3.3 Information

The Operation shall determine the information necessary for control of processes and to ensure conformity of product and service. System level procedures for managing information shall ensure access to and protection of information.

3.4 Infrastructure

The Operation shall determine, provide and maintain the infrastructure needed to achieve the conformity of product and/or service. This shall include:

- buildings, workspace and associated utilities
- equipment, hardware and software
- suitable maintenance, both preventive and restorative
- supporting activities such as health or environmental analysis

3.5 Work Environment

The Operation shall determine and implement human and physical factors of the work environment needed to achieve conformity of product and service including as appropriate:

- health and safety conditions
- buildings, workspace and associated utilitieswork methods
- buildings, workspace and associated utilitiesergonomics, and
- buildings, workspace and associated utilitiesambient working conditions such as heat, humidity, light, airflow, etc.

4.0 Design Control

The purpose of this section is to identify and define the procedures and processes used to control and verify the design of products produced by the organization.

4.1 Product Planning

Processes that are necessary to realize the required product and/or service and their sequence and interaction shall be determined, planned and implemented. In determining such processes the Operation shall consider the outputs from quality planning. Processes include: customer-related processes, design and development, purchasing, production and service operations, and control of measuring and monitoring devices.

4.2 *Customer-Related Processes*

4.2.1 *Identification of Customer Requirements*

The Operation shall establish a process for identifying customer requirements. This process shall determine the:

- buildings, workspace and associated utilities
- Completeness of the customer's product and/or service requirements including delivery and installation, where applicable (e.g., contract review);
- Requirements not specified by the customer, but necessary to satisfy the customer, where known;
- Obligations related to the product, including regulatory and legal requirements;

4.2.2 *Review of Customer Requirements*

The customer requirements, including any requested changes, shall be reviewed before a commitment to supply a product is provided to the customer to ensure that:

- requirements are clearly defined;
- where the customer provides no written statement of requirement, the customer requirements are confirmed prior to acceptance;
- contract or order requirements differing from those previously expressed, e.g. in a tender or quotation, are resolved;
- The Operation has the ability to meet the customer requirements.
- Regulatory and legal requirements where known, are met
- Records of the review shall be maintained. When changes are made, personnel shall be made aware of documents changed accordingly.

4.2.3 *Customer Communication*

The organization shall implement arrangements for communication with customers, with the aim of meeting customer requirements. The Operation shall define communication requirements relating to:

- product and/or service information
- inquiry and order handling, including changes
- customer complaints and actions relating to nonconforming product and/or service

4.3 *Design and Development*

Procedures shall be maintained to control, verify and validate the design and development processes.

4.3.1 *Design and Development Planning*

Major activities performed in the design and development of products shall be documented. A procedure shall be established and maintained that defines responsibilities and authority for each activity. Each activity shall include defined reviews, verifications and validations as appropriate for that activity.

4.3.2 *Organizational and Technical Interfaces*

Interfaces between organizational or technical areas, including areas with design input information, shall be identified as part of the design planning. Reviews shall be conducted regularly to ensure communication between the areas is sufficient to preclude informational voids or barriers. Procedures shall be in effect to ensure necessary information and documentation is transmitted between any such interfaces.

4.3.3 *Design and Development Inputs*

Procedures shall be established and maintained that allow for design and development inputs relating to the product to be identified, documented, and reviewed for adequacy. Inputs shall include functional and performance requirements, applicable regulatory or statutory requirements (e.g. Weights & Measures, ASME), and other information as applicable.

4.3.4 *Design and Development Outputs*

Design output shall be recorded and documented. Design output shall be verified against the design input, and reference or include acceptance criteria. Design outputs shall identify characteristics that are crucial to safe operation and proper functioning of the product. Outputs information shall be in a format to allow for purchasing, production, and servicing of the product as appropriate.

4.3.5 Design and Development Review

Documented reviews shall be held at appropriate stages of design and development as defined by the project plan. Relevant departments or organizational areas affected by the design at that stage of development shall be represented.

4.3.6 Design and Development Verification

Procedures shall be maintained that allow for the planning, establishment, and documentation of activities verifying the completed design prior to release. Verification shall establish that design output meets the design input requirements. Design verification activities shall be performed by competent personnel, and may consist of design reviews, alternative calculations, or the comparison of the design to similar, proven designs. Records of verifications shall be maintained.

4.3.7 Design and Development Validation

Testing or validation of products shall be conducted as appropriate for the design. Requirements for validation and acceptance shall be documented or referenced prior to release of the design. Validation may include simulated or actual field conditions. Validation may be performed either by company or external personnel, agencies or organizations, or by customers or end users upon their agreement. Records of verifications shall be maintained.

4.3.8 Control of Changes

Identification, documentation, review, and approval of all design changes and modifications shall be accomplished either as separate procedures or incorporated into other procedures. Safety agencies shall be appropriately notified when changes affect product approval. Changes shall not be implemented until relevant agency approval is granted.

4.4 Purchasing

Processes used to ensure that purchased product conforms to the Operation's requirements shall be defined and documented. The type and extent of methods to control these processes shall be dependent on the effect of the purchased product and/or service upon the final product and/or service.

4.4.1 Evaluation of Suppliers

Suppliers shall be evaluated and selected on their ability to meet quality, delivery, and cost requirements. Criteria used in making an evaluation shall be based on the product or service being supplied, and may include some or all of the following: a prior history of supplying acceptable product, on-site supplier evaluation by the Operation personnel, performance of supplier in providing similar product delivered to other customers, or other methods that allow objective evidence of supplier capability.

4.4.2 Purchasing Information

Purchase orders shall contain or reference information clearly describing the product and/or service ordered, including where appropriate:

- requirements for approval or qualification of product and/or service, procedures, processes, equipment and personnel;
- any management system requirements.

The Operation personnel shall ensure the adequacy of purchasing documents for the specification of requirements prior to release.

4.4.3 Verification of Purchased Product and/or Services

The Operation shall maintain procedures to ensure product received meets requirements.

Purchase documents shall specify verification arrangements and method of product release when product is to be inspected or verified at the supplier's premises.

Where specified by the contract, the customer or customer representative shall have reasonable access to work being performed for the execution of the contract. Access shall be limited to normal working hours unless specific arrangements are made in advance. Customer access also extends to supplier facilities where specified.

Any such verification done at the supplier's facility shall not be used as sole evidence of effective quality control. Onsite verification shall not preclude the customer's right of subsequent rejection.

4.4.4 Production and Service Operations

Production operations are designed to produce products that meet the design requirements. Service operations are provided to meet contractual obligations for customer support.

4.5 Process Control

This section defines the responsibilities for establishing, maintaining, and monitoring of in-process quality standards.

4.5.1 Work instructions

Work instructions shall be established for all processes that affect deliverable product including installation and servicing where applicable. These work instructions may include routers, process specifications, test documents, gage procedures, quality plans, and/or other procedures and documents as applicable.

4.5.2 Equipment maintenance

Procedures shall be established that define and document equipment maintenance requirements. As a minimum, procedures shall provide for the identification and performance of maintenance for equipment used on the manufacturing and/or service processes to ensure continued process capability.

4.5.3 Special processes

Special processes, which are not or cannot be fully verified by subsequent inspection, shall be controlled via written procedures and/or work instructions. Special processes are defined as those processes that, after completion, cannot be verified by subsequent inspection of the product and where deficiencies will become apparent only after the product is in use. Qualification of special processes and personnel performing those processes shall be performed as appropriate, in accordance with industry standards or as required to assure the adequacy of the process. Records of qualifications shall be maintained.

Special processes include permanent joining of main pressure retaining parts, nondestructive testing processes, and hydrotesting.

4.6 Product Identification and Traceability

The purpose of this section is to establish and maintain requirements for identification of product throughout the manufacturing cycle.

4.6.1 Product Identification

Product identification shall be maintained throughout the manufacturing process, including production, delivery, and installation, as appropriate. Identification may be by means of attached or accompanying routing slips, drawings, or other documents. Identification may also be made by means of part numbers attached, accompanying, or integrated into the product such as by stamping, casting, marking, etc.

4.6.2 Material Traceability

Traceability of raw material shall be recorded and maintained when specified by customer contract or as required by approval agencies or directives. Traceability may be accomplished via heat numbers, material certification tags, serial numbers, or other means that allow for raw material lot identification.

4.7 Customer Property

In the event that a contract requires material or goods to be supplied by the customer, standard procedures with respect to inspection, identification, storage, etc., shall apply unless otherwise specified in the contract. Any such product that is lost, damaged, or otherwise unsuitable for use shall be recorded and reported to the customer.

4.8 Handling, Packaging, Storage, Preservation and Delivery

This section defines the procedures required to ensure proper handling, storage, packaging, and delivery of product.

4.8.1 Handling

Procedures shall be maintained that provide methods of handling work in process or raw material for deliverable product. These procedures shall ensure that pallets, tote boxes or bins, containers, hoists, vehicles, etc., are correctly applied to prevent damage or deterioration to product, while also ensuring the safety of personnel engaged in the manufacture of the items.

4.8.2 Storage

Procedures for the storage of raw material, work in process, or completed items shall be established and maintained in order to ensure that no damage or deterioration occurs. In the event of age-sensitive product or raw material, procedures shall be established that provide for identification and rotation of stock to ensure no deteriorated product is used in the manufacturing process nor shipped by customers.

4.8.3 Packaging

Packaging, preservation, and marking processes shall be controlled via documented procedures to the extent necessary to ensure conformance to specified requirements, and to segregate product from the time of receipt to the time responsibility for the product ceases as stipulated by contract.

4.8.4 Delivery

Protection of the quality of the product shall extend to the period after final inspection and test. In addition, where contractually obligated, this protection shall extend to include delivery to the final destination and/or installation. Where required, legally binding declarations shall be available prior to product shipment.

4.9 Calibration System

4.9.1 Measurement and Equipment Requirements

Measurements to be made shall be identified via drawing, specification, or other method, and shall define required accuracy. Appropriate equipment shall be selected for making the measurements. Equipment used shall be selected so that the accuracy and precision necessary is assured.

All inspection, measuring, and test equipment used on deliverable product, irrespective of ownership of such equipment, shall be calibrated prior to use. Calibration of equipment shall, in all events, be performed prior to first use and may be calibrated at periodic intervals thereafter or may be calibrated each time before subsequent use as applicable.

4.9.2 Equipment Calibration

Inspection, measuring, and test equipment used for product verification or process control shall be calibrated using standards traceable to a national standard.

4.9.3 Calibration Intervals

Periodic intervals shall be established by manufacturer's recommendation, or based on the type of equipment, conditions of use, and prior calibration history. Factors influencing calibration intervals include individual item history, equipment type or class history, location or usage history, and results of previous calibrations. Equipment suspected of being out of calibration shall be calibrated irrespective of previously established calibration intervals.

4.9.4 Calibration Status

Documented calibration procedures shall be used to ensure that equipment is calibrated under conditions suitable for the calibration being carried out. Records of calibration shall be maintained which include a detail of equipment type, identification number, location, frequency of checks, and results of prior calibrations.

Each piece of equipment shall, whenever possible, be tagged with a suitable indicator to show the calibration status. Equipment used for purposes other than product verification or process control may be exempted from calibration, and shall be identified accordingly (e.g. "Cal not required" label).

4.9.5 Equipment Found Out of Calibration

Whenever equipment is found to be out of calibration, an assessment shall be performed of the validity of previous inspection and test results. When such assessment indicates adverse conditions may be present a management evaluation of potential field action will be conducted. Possible outcomes of such an evaluation include: recall for re-inspection, field replacement / rework, customer notification, or in the case of conditions unrelated to safety, environmental hazard, or product performance internal action and monitoring.

4.9.6 Handling, Preservation and Storage

Inspection, measuring, and test equipment shall be handled, stored, and preserved in a manner that precludes degradation of accuracy and fitness for use.

4.9.7 Jigs and Fixtures as a Means of Inspection

Test hardware (including jigs, fixtures, templates, patterns, etc.) used as a means of inspection shall be checked periodically for condition and wear. Documentation shall be maintained accordingly.

4.9.8 Test Software

Software shall also be checked at periodic intervals thereafter or prior to each use as defined by procedure. The extent and frequency of such checks shall be determined by the type and function of the software, and may include checksums, file creation time/date information, file size, or other factors as necessary to detect inadvertent changes in the software.

Records of such checks shall be maintained. Software embedded in or used with specific test hardware or test fixtures need not be checked independently, provided calibration of such hardware or fixtures includes the use of the software.

5.0 Measurement, Analysis, and Improvement

5.1 *Measurement and Monitoring*

The organization shall apply suitable methods for measurement and monitoring of processes necessary to meet customer requirements and to demonstrate the process's continuing ability to satisfy its intended purpose.

5.2 *Measurement and Monitoring of Customer Satisfaction*

Customer feedback will be monitored by the customer service function as defined by procedure. This may include measures of customer complaints, customer correspondence, customer satisfaction surveys, customer visit reports, etc.

5.3 *Internal Quality Audits*

Audits shall be used to determine the adequacy of the quality management system, identify deficiencies, and initiate corrective actions. Management personnel shall be informed of the results of the audit and shall take timely corrective action measures on any deficiencies revealed by the audit. Follow-up audits may be utilized to ensure that corrective actions are effective.

A schedule shall be established that identifies areas to be audited. Frequencies shall be established on the basis of the importance of the area, as well as prior audit results or other indications or deficiencies within the area.

Personnel shall be assigned to conduct audits based on the appropriateness of individual qualifications, experience, and training. Additionally, audits shall be performed by personnel who do not have direct responsibility for performing or supervising the activities being audited, i.e. auditors shall not audit their own work.

5.4 *Measurement and Monitoring of Processes*

Appropriate measures of process performance will be identified and implemented. Examples of measures that may be used include Balanced Scorecards, Measure Boards, Statistical Process Control, and flow test results.

5.5 *Measurement and Monitoring of Product and/or Service*

The purpose of this section is to define the requirements necessary to ensure proper inspection and tests of deliverable products, thereby ensuring that cost-effective measures are utilized to detect and eliminate non-conformances at the earliest point.

5.5.1 *Receiving Inspection and Testing*

Incoming products shall be inspected at receiving prior to use as necessary. This inspection shall be performed in accordance with established procedures, be appropriate for the requirements specified for the product, and take into account supplier quality activities and history as appropriate. The inspection status of each lot shall be readily identifiable.

5.5.2 *In-Process Inspection and Testing*

In-process inspection points shall be identified and documented by the use of routers or quality plans. Completion of inspections may be signified by the use of a controlled inspection stamp, by signature or initials of the person performing the inspection, or other documented means. In the event a non-conformance is detected, it shall be handled in accordance with the nonconformity section of this manual.

5.6 *Final Inspection and Testing*

Final inspections shall be performed per documented procedures, work instructions, or quality plans, and shall include verification that all prior in-process inspections were performed as required, as well as the completion of all manufacturing and fabrication operations.

5.7 *Inspection and Test Records*

Results of inspections and tests shall be documented by electronic means, or other prescribed documentation. Records shall clearly indicate whether the product has passed or failed.

5.8 *Nonconformity Review and Disposition*

A non-conformity is any condition which does not comply with applicable drawing, code, specification, or other documents pertaining to the product or service.

Material, items, or activities determined to be nonconforming shall be identified by the use of a tag or marking. Identification shall be clearly visible to prevent inadvertent or unauthorized use pending disposition. Whenever practical, non-conforming product shall be physically separated from conforming items.

Non-conforming items shall be reviewed and dispositioned per documented procedures. The disposition shall determine the documentation necessary for each specific non-conformance. Procedures shall be used to define required documentation and actions necessary for each category of disposition.

Disposition of non-conforming items shall be categorized e.g., fit for use, rework or repair, return to supplier, or scrap. Documented procedures shall be used to determine disposition and subsequent actions necessary for each category.

Where contractually obligated, dispositions of "use as is" or "rework or repair" shall not be made without the approval of the customer or customer's representative.

5.9 Analysis of Data for Improvement

A system level procedure for the analysis of applicable data shall be established to determine the effectiveness of the quality management system and for identifying where improvements can be made. Improvements may take the form of product re-design, process mistake-proofing, budget reconciliation plans, etc. The organization shall collect data generated by measuring and monitoring activities and any other relevant sources.

The Operation shall analyze applicable data to provide information on:

- the suitability, effectiveness and adequacy of the quality management system;
- process operation trends;
- customer satisfaction and/or dissatisfaction;
- conformance to customer and internal requirements and;
- characteristics of processes, products and/or services.
- Statistical techniques will be used when appropriate to improve analysis.

5.10 Statistical Techniques

Statistical techniques may be established and utilized wherever such procedures are suitable to maintain required control of processes or to evaluate the suitability of processes. This applies not only to manufacturing processes, but also in the analysis of data from other processes. Statistical techniques shall not be used for critical safety checks, (e.g. hydrotest) or where the techniques are prohibited by codes.

5.11 Improvement

The elimination of non-conformances, whether historically occurring or anticipated, is a major source of improvement. In addition to non-conformances, key process measurements will be used to analyze processes and work operations. The quality assurance function will assist in the implementation of corrective and preventive actions and in the application of analysis tools and techniques.

5.11.1 Corrective and Preventive Action Initiation

It shall be the responsibility of each individual to bring to management's attention the need for corrective and preventive action. Procedures for initiating action shall be documented and disseminated throughout the organization. Action initiation shall not be limited to deliverable product or services, but shall recognize the internal customer/supplier relationship throughout the organization. Provisions shall be made and documented such that all departments or areas are afforded the opportunity to initiate action.

5.12 Analysis of Processes and Work Operations

It shall be the responsibility of the quality assurance function to ensure that processes, work operations, quality records, service reports, and customer complaints are analyzed to detect and eliminate systematic errors and potential causes of non-conformances.

Analyses may be conducted via data gathered through audits, customer contacts, field service of marketing personnel, or any other means necessary. Analysis shall be used in assigning priorities to preventive actions based on potential risks associated with the reoccurrence of the non-conformance.

5.13 Implementation

It shall be the responsibility of the quality assurance function to monitor corrective and preventive actions to ensure their implementation and evaluate their effectiveness.

6.0 Processes

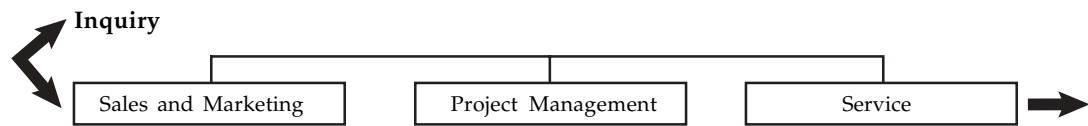
6.1 Superior Products

Superior Products are measured by: On Time Delivery and Reliability.

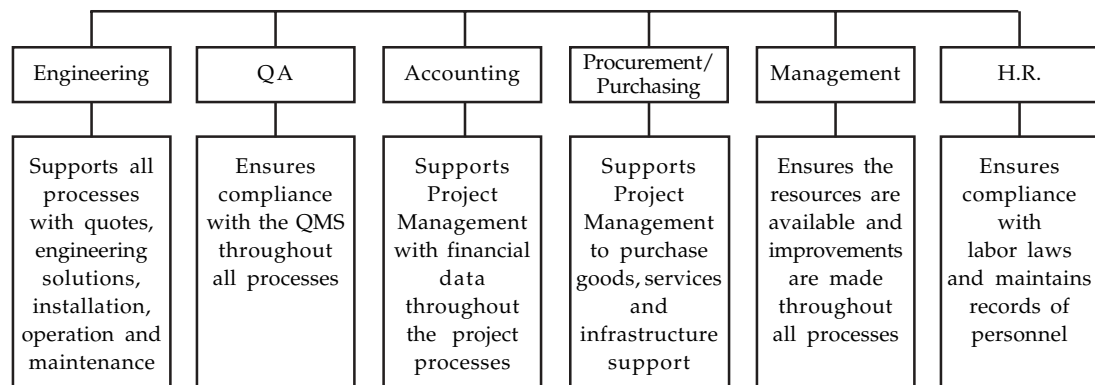
6.2 Competitive Products

Competitive Products are measured by: Warranty Costs and Lost/Gained Quotes.

6.3 Inquiry



6.4 Support Processes



7.0 Quality Procedures

Document Control

Corrective Action

Internal Audits

Control of Nonconformance

Preventive Action

Records

The specifications contained herein are subject to change without notice and any user of said specifications should verify from the manufacturer that the specifications are currently in effect. Otherwise, the manufacturer assumes no responsibility for the use of specifications which may have been changed and are no longer in effect.

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