



APEX

M I C R O T E C H N O L O G Y

QUALITY MANUAL

VISION

Provide the best precision control products that solve specific market application challenges

MISSION

Design, manufacture and market globally best-in-class operational amplifiers, PWM amplifiers, and motion control products. These products provide system cost, space, and time-to-market savings for our customers requiring precision control in their application.

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About This Document

This document defines the policies for the Quality Management System in place at Apex Microtechnology, located at 5980 N. Shannon Road in Tucson, Arizona 85741. Detailed contact information can be found at the Apex website www.apexmicrotech.com


Apex's Quality Management System maintains continuous dual compliance with ISO9001: 2000 and MIL-PRF-38534. The system has been certified since 1994 and continues to be third party, recertified on a routine basis. Current copies of both certificates of compliance are available to view and to print at the Apex website www.apexmicrotech.com

4.0 Quality Management System (QMS)

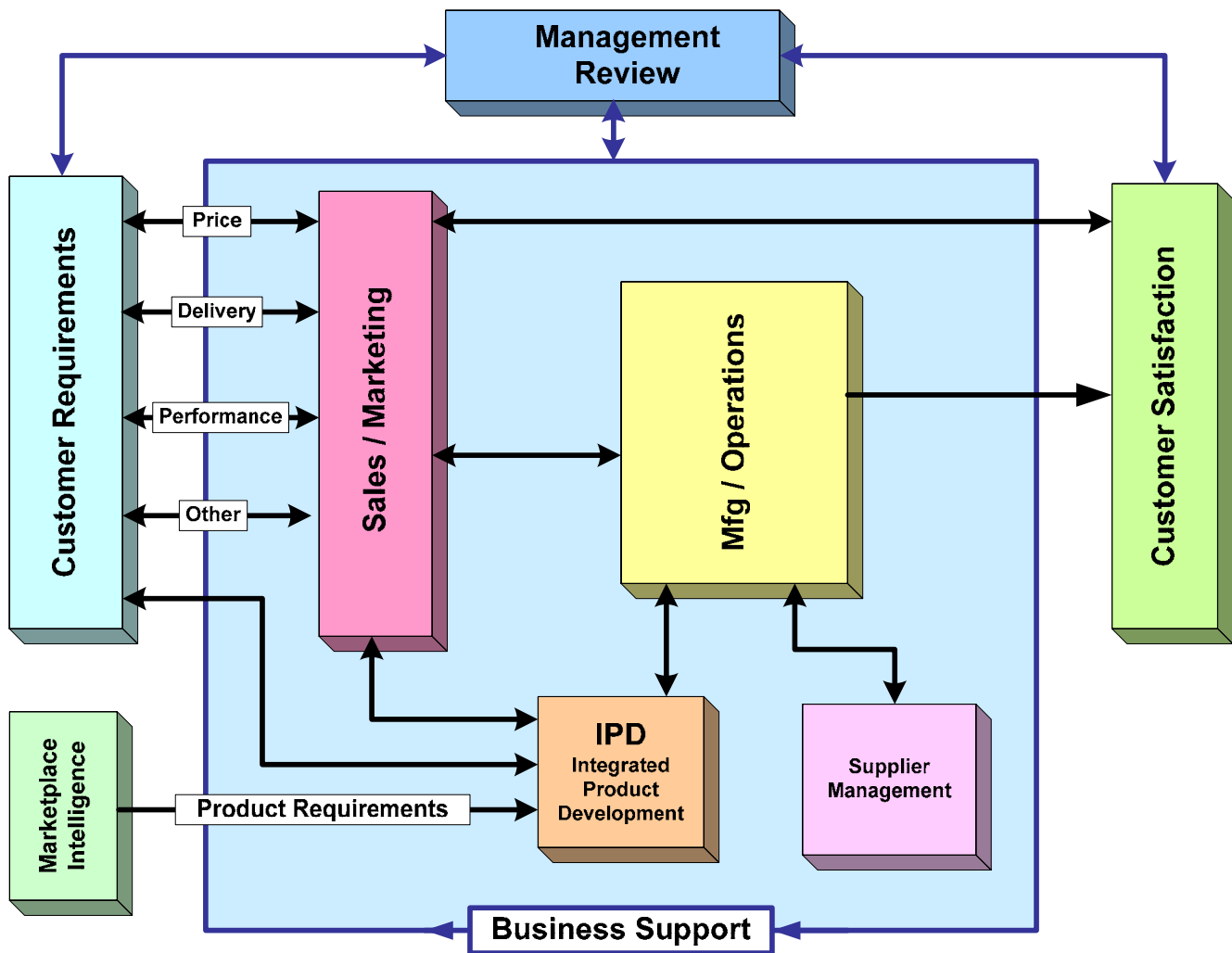
The scope of the Quality Management System (referred to as QMS in this document) at Apex Microtechnology provides for customer-focused communication starting with the ideation and conception of new product ideas through product development and realization, manufacturing, sales and applications support. The scope of this Quality Management System is intended to be comprehensive and compliant with MIL-PRF-38534D with Appendix A and ANSI/ISO/ASQ Q9001-2000 as well as all other statutory regulations.

EXEMPTIONS - This QMS shall not be applicable to prototypes, experimental projects, or products strictly for in-house use and not related to salable products or services. In addition, personnel or consulting services shall not fall within the scope of this QMS unless they are used in development or product realization for saleable product.

The general requirements for the QMS include processes, which detail the methods and criteria to measure the effectiveness of the QMS and create opportunity to evaluate and initiate a plan for improvement. The plan for improvement is developed at the start of each fiscal year, however there is opportunity throughout the year to plan improvements based on the Management Review of the QMS governed by the current revision of QUAL26. The sequence and interaction of the QMS processes are identified below.


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Apex Microtechnology Key Processes



4.1 Organizational Structure

The organizational structure is documented and in the current revision of CORP60. Several departments report directly to the President and CEO: Finance, Sales/Marketing, Development Engineering, Information Technology, and Operations. Quality reports to the Vice President of Manufacturing. Applications Engineering reports to the Vice President of Sales/Marketing.

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4.2 Documentation and Records

QMS processes are documented in revision-controlled specifications. Each revision-controlled specification begins with a designation such as QUAL, CALP, CORP, ENGP, or OFFL. This serves as a general structure distinguishing quality processes from corporate processes and offline processes. This document references many of these specifications. Changes to these revision-controlled specifications can only be made through the Document Change Authorization process found in the current revision of OFFL60.

Apex Microtechnology believes documentation and record keeping is an integral part of an effective and efficient QMS. Therefore, there is strict adherence to retention of records associated with processes and product produced at Apex. Some retention periods are defined below.

Many records are kept electronically and are controlled by the information systems department through controlled access and periodic backup.

Design History files are governed by the Integrated Product Development (IPD) system. Changes in design of released product are documented in the Document Change Authorization process (OFFL60). Records of DCAs are kept on file in configuration management history files.


Military product qualification records are maintained indefinitely. Lot history for Military product is retained for a period of five (5) years. Commercial product lot history records are retained for a period of five (5) years.

Personnel training and testing records are retained for a minimum of one (1) year. Product design histories, military qualification records and (when required by contract) First Article Inspection (FAI) records shall be retained indefinitely.

Quality Records are defined and identified as internal documents that serve as a record of the inspection and/or test of product during manufacturing processing. Some quality records are electronic in nature and are archived by the information technology team. The lot histories are archived for the period of time detailed above and controlled, ultimately per OFFL40.


Additional quality records, including but not limited to incoming evaluations, Defective Material Reports (DMR's), Notice of Deviation Reports (NDR's), Corrective or Preventive Action Requests (CAR's), Conformance Inspection results, Test results, and First Article Inspection (FAI) records (when required by contract) are collected by the responsible member of the organization. Access to records is controlled in order to ensure the integrity of the records.

The Quality Leader controls revision controlled documents from external origin. A master list of documents and revisions is kept by the Quality Leader. Obsolete revisions are kept for comparison. The user is responsible for understanding revision status.

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Apex Microtechnology Documentation Matrix

Process Sequence and Interaction	APEX Internal Documents	MIL-PRF-38534 and Appendix A	ISO9001: 2000
Organization	CORP60	A.3.1	5.5.1
Responsibility and Authority	CORP60	A.3.1	5.5.1
Resources	QMANUAL		6.0
Management Representative	QMANUAL		5.5.2
Management Review	QUAL65		5.6
Quality System	QMANUAL	Appendix A	4
Quality System Procedures	QMANUAL	A.3.1	4.2
Quality Planning	QUAL65 ANNUAL GOALS		5.4.2 7.1
Process Control	QMANUAL OFFL57 FLOW99	A.3.9	6.3, 6.4 7.5 8.2.4
Control of Quality Records	QMANUAL OFFL40	A.3.16	4.2.4
Corrective and Preventative Action	QUAL203	A.3.14	8.5.2, 8.5.3
Failure Analysis and Servicing Customer Returns	QUAL44 QUAL06 QUAL54 OFFL52	A.3.13	7.5.1
Statistical Techniques	OFFL57		8.4
Design Control	IPD	A.3.4	7.3
Internal Quality Audits	QUAL26 AUDT84 AUDT85	A.3.17	8.2.2 8.2.3
Document and Data Control	OFFL60 PROC00	A.3.5	4.2
Control of Inspection, Measuring and Test Equipment	QUAL03	A.3.11	7.6
Communicating Government / Customer / Apex Information	DOCM06 QUAL215 QUAL55 MKTG08	A.3.3	7.2.3
Contract Review	QUAL215 QUAL55 MKTG08	A.3.3	7.2.2
Purchasing	OFFL23 QUAL52 (Component specifications)	A.3.6	7.4
Incoming Inspection	QUAL52	A.3.6	7.4.3
Training and Certification	TNG01	A.3.18	6.2.2
Chemical Safety	CORP37 OFFL50		6.3
Manufacturing control	FLOW01 FLOW05 FLOW10 FLOW99 QUAL21	A.3.8 A.3.9 A.3.12	6.3 6.4 7 & 8
Lot Acceptance	PROC99 QUAL21	A.3.10	7.5.3

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Process Sequence and Interaction	APEX Internal Documents	MIL-PRF-38534 and Appendix A	ISO9001: 2000
Product Assurance	PROC55-59 PROC99	A.3.10	7 & 8
Handling, Storage, Delivery	OFFL05 QUAL23 QUAL21 OFFL24	A.3.15	7.5.1 7.5.5
Control of Non-Conforming Product	QUAL28 QUAL46 QUAL205	A.3.13	8.3
Inspection and Test Status	QUAL21 QUAL13 PA00F2	A.3.10	7.5.3
Internal Communication / Continuous Improvement / Customer Satisfaction	QMANUAL		5.5.3 8.5.1
Monitoring and Measuring Processes	QUAL26 OFFL57	A.3.17	8.2.3
Analysis of Data	QUAL26 QUAL65		8.4
Control of Government/Customer Property	QUAL19	A.3.7	7.5.4


5.1 Management Commitment

The Quality Manager is the ISO9001:2000 Management Representative and is responsible for monitoring and improving all aspects of the QMS. The Quality Manager has the delegated authority and responsibility to ensure quality system elements comply with ANSI/ISO/ASQ Q9001-2000 and MIL-PRF-38534D requirements.

The entire Leadership Staff defines the Quality Goals annually and reviews the effectiveness of the Quality System quarterly or more often as defined in the current revision of QUAL65. The Leadership Staff is comprised of the President and Leaders from the following areas of the organization: Quality, Finance, Design Engineering, Sales, Operations, Manufacturing and, Information Technology, The organization is defined by function in the current revision of CORP60.

5.2 Customer Focus

Apex maintains a customer focus in all aspects of the organization. The QMS supports the delivery of product, which meets all customer requirements. Additionally, the customer is the focus of every new design from the concept phase through delivery and applications support.

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5.3 Quality Policy

Our goal is to be #1 with our customers. We are committed to providing products and product related services that exceed our customers' expectations by adhering to a systematic approach to Quality Management.

Our progress toward this goal is monitored through routine review of measurable goals and routine communication of this progress during company communication meetings, intranet reports of progress and through closed circuit TV communication of progress toward goals. Quality of product and processes is our number one priority!

Our Quality Policy states a definition of Quality.


"Apex Defines Quality as Minimum Variation and Maximum Customer Satisfaction"

5.4 Quality Objectives and QMS Planning

Quality planning is implemented and carried out through the quality objectives set annually, and by supporting strategies. The focus of Apex's quality planning is continuous reliability and quality improvement by reducing reliance on inspection through statistical techniques.

Product Realization planning begins with Customer Service. Customer Service reviews customer specifications prior to accepting a contract. The purpose of this review is to ensure the end item meets the requirement of the contract, fulfills customer needs, and meets APEX Baseline Documentation. This review shall insure quality requirements, testing, and documentation meet contractual requirements. If required by contract, customer approval of sampling plans and procedures shall be obtained prior to using acceptance sampling on product. Customer Service personnel may arrange an extended review with input from Quality as necessary to review customer purchase orders to ensure Apex is meeting customer requirements.

Quality System planning is conducted when Top Leadership establishes the Annual Tactical Plan, which identifies the Goals and Objectives for growth and improvement. Continued planning occurs at the Quarterly Management Review when the team reviews the effectiveness of the Quality System and identifies areas for improvement.

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5.5 Responsibility and Authority & Communication

A major change to military product is communicated to DSCC through the current revision of OFFL60.

Apex performs full review of customer requirements prior to accepting orders. The Source Control Drawing Review process notes all exceptions and communication is documented.

When a customer requires order acknowledgement, Customer Service provides one.

Means of communicating with customers are tailored to meet customer expectations and requirements. The Apex website is effectively used to communicate product information. Electronic mail and telecommunications are used to meet specific order information including amendments.

Several means of frequent communication have been established within Apex. Closed Circuit TV is utilized to display the Quality Policy, pareto data, trends and progress toward Quality Goals. A Company Meeting is held quarterly or more frequently in order to discuss all company business including progress toward Quality Goals and Objectives. Members of the Leadership team including the President present information.

5.6 Management Review of the QMS


Apex has developed a program of routine review of the Quality Management System, which involves every member of the Leadership Staff. This process is governed by the current revision of QUAL65. Records of the review are maintained and preserved in accordance with the quality record archive specification in the current revision of OFFL40 and this document.

6.1 Provisions of Resource Management

Apex views resources as invaluable. Our equipment is maintained through a routine preventive maintenance schedule. The facility is maintained and equipment upgrades are planned for well in advance of the actual need. Production output is measured and monitored which provides a useful means to evaluate our equipment resources against planned production forecast.

6.2 Human Resources

Our human resources are our most valued resource. Team Members at Apex average **over 12** years of service within our organization. This longevity is invaluable. We put great emphasis on keeping our skilled and highly trained individuals within our framework and cross-functional training is documented and managed through the current revision of TNG01. Our operators are certified to work in the processes they carry out and that certification is reviewed and renewed according to the TNG01 procedure.

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6.3 Infrastructure

Building, workspace, equipment and utilities are provided for and maintained to achieve conformity to product requirements under the direction of Operations. Top Leadership evaluates the need for added technology when planning continuous improvement of the Quality System during Management Review or more frequently as needed. This includes both hardware and software improvements.

The basic equipment and facilities for performing required routine inspection are available in-house. When necessary, outside test laboratories are employed to perform calibration and environmental or package tests which cannot be performed in-house.

6.4 Work Environment

The entire operations area is controlled and rated as a class 100,000 clean room environment. Periodic monitors governed by the current revision of QUAL23 assure continued compliance. Monitors take place in every area of operations from the stockroom through the manufacturing floor. Cleanroom attire and ESD control are strictly enforced and governed by the current revisions of QUAL21 and OFFL24 specifications, respectively.


7.1 Planning of Product Realization

A system for identifying the inspection status of products is maintained through identifiable stickers, stamps and flowsheets, as well as computer log-off.

APEX WORKMANSHIP - Our product is manufactured, processed, and tested in a controlled environment with the highest of military workmanship standards in accordance with good engineering practices, customer requirements, the requirements of the applicable military specifications, production practices, training instructions, inspections, and test procedures.

7.2 Customer-Related Processes

Apex's Customer Service Team reviews each purchase order prior to acceptance. The process for review of each purchase order is governed by the current revision of MKGT08 (standard purchase order) and QUAL55 (purchase order placed to a Source Controlled Document)

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7.3 Design and Development

A phased-gate process called Integrated Product Development, or IPD system is in place, which tracks the progress of design and development projects. This fully integrated system consisting of 6 phases begins with customer requirements during the conception phase. The system provides for continued verification of customer requirements prior to advance to each of the progressive phases of development. The records of each Phase Gate Review are documented, filed and controlled on the Apex Intranet. These files are archived for historical reference. The document governing the IPD process is electronically controlled on the Apex Intranet.

7.4 Purchasing Process

Quality Inspection ensures that all materials acquired from suppliers (sub-contractors and vendors) meet or exceed Apex quality requirements. The specification for Procurement is governed by OFFL23. The selection of sources of supply and the nature and extent of control exercised shall be dependent upon the type of materials, the supplier's demonstrated capability to meet our specific needs, and their demonstrated commitment to continuous quality improvement.

7.5 Production and Service Provision


Applications Engineering support is available during all phases of a contract including service following a sale. Our Applications Engineers are available to provide support to our customers and they are in direct communication with the Process Engineers who are responsible for tracking production flow information about every lot. These provisions are extended to all customers and if necessary, a return authorization is permitted using the current revision of QUAL54 in order to study the application issue further. The QUAL06 process governs the process information feedback to the customer.

7.6 Control of Monitoring and Measuring Devices

A comprehensive calibration program is in place to track and recall each measuring and each monitoring device. The system is tracked in MetCal MetTrack database and monitored by a monthly recall list. The system is governed by the current revision of QUAL03.

8.1 Measurement, Analysis and Improvement

Apex continues to evaluate the effectiveness of the QMS through methods governed by the internal auditing process found in the current revision of QUAL26 and through management review of the QMS found in the current revision of QUAL65. Preventive actions are used to measure and analyze data to assess improvement needs and actions taken to create improvements.

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8.2 Monitoring and Measurement

Processes are monitored throughout manufacturing and test. Procedures for this monitoring are contained in the individual written specs for each process. Scheduled internal auditing is carried out and provides further monitoring of processes. Statistical Process Control is utilized for product acceptance according to OFFL57. Process capability, yields, progress-to-goal and productivity measurements are routinely monitored and measured.


8.3 Control of Nonconforming Product

Apex maintains effective and efficient systems for evaluating and controlling nonconforming material, including procedures for identification, segregation, and disposition of such material. Depending on the location of the discrepant material, any of the following systems may be employed. QUAL21 – Clean Room Procedure provides general instructions for control of nonconforming material. The current revision of QUAL205 governs an effective Material Review Board system. The current revision of QUAL46 governs a process for recording a deviation to a process or product during manufacturing and clearly documents and defines the disposition of the product. The current revision of QUAL07 governs the process of segregating and applying disposition to incoming material that does not conform to specification.

8.4 Analysis of Data

Data is collected and analyzed for trends and where applicable, corrective action. Data includes but is not limited to weekly manufacturing defect Pareto charts, yield at quality gates, wirebond process capability, productivity, customer perception, customer returns and internal self-audit results.

Statistical analysis and sampling techniques are implemented and utilized for key processes to maintain and improve process capability and control. Quality Engineering is responsible for the planning, training and implementation of Statistical Process Control programs throughout the company. APEX utilizes SPC data whenever possible at key processes in an effort to eliminate end-of-line inspections and reduce reliance on 100% inspections.

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8.5 Improvement

The Apex Quality Policy drives continual Improvement. Improvement Goals are established annually, and milestones are measured at the Management Review.

All Apex team members ensure the continuous quality improvement of (1) the Apex Quality Management System processes and specifications and (2) all materials and services utilized in the manufacture of all salable products.


The QMS provides many vehicles for continuous improvement through self-audit (QUAL26), SPC (OFFL57), corrective and preventive action (QUAL203), customer compliant system (OFFL111) to name a few.

Apex identifies internal and external customers. Internal customers are surveyed periodically to assess their satisfaction and solicit input for improvement through "Skip Level Dialogue" with the president of the company.

Apex external customers are welcome to voice complaints or any other input. OFFL111 provides a means to document a complaint via fax, phone, email, or other meeting. The Apex Microtechnology website contains direct contact information for customer feedback.

Preventive actions are used to eliminate the cause(s) of **potential** nonconformities. APEX employs the following preventive actions throughout the organization; Review/analysis of product/process yields (Quality Engineering/Leadership Team), Quality reports providing Pareto analysis of anomalies detected (Operations Leadership Team/Quality Engineering), Quality Audit results (Quality Leader/Leadership Team), and Customer Complaint Analysis (Sales/Marketing and Leadership Team). Trends are analyzed and Preventive Actions are assigned, implemented and reviewed through three separate processes depending on urgency. Long-term actions are put into the Annual Quality Goals, medium range actions are put into the Management Review (QUAL65) and short-term actions can be placed in the Corrective or Preventive Action process (QUAL203).

Corrective actions are used to eliminate the cause(s) of **actual** nonconformities. APEX documents and maintains a written specification of a process, which promptly analyzes the cause of nonconformities and implements corrective action to prevent recurrence. This process is governed by the current revision of QUAL203. The process applies to all areas of the company such as engineering, design, purchasing, manufacturing, testing or any other operation, which is essential to product or service quality.

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