



## QUALITY MANUAL

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### REVISION HISTORY

<b>REVISION</b>	<b>DESCRIPTION</b>	<b>ENTERED BY</b>
08/09/07	Update to reflect functional QMS structure	Jason Tesar
02/23/07	Revised per internal audit findings (DCR070604)	Denise Sams
08/18/06	DCR approved – initial release	Angela Hartlove
08/10/06	Submit to Platinum as audit prep.	Angela Hartlove
07/12/06	Input Joanne's changes	Angela Hartlove
06/30/06	Completion of new QM draft	Angela Hartlove

## **1. PURPOSE AND SCOPE**

- 1.1. The purpose of this document is to describe the Quality Management System (QMS) at Aspen Technologies, define its requirements, assign responsibility, and provide guidance for its implementation.
- 1.2. The scope of this document is limited to the fundamentals, requirements, and guidelines provided in ISO documents 9000:2000 and 9001:2000, and applies to all quality related activities at Aspen Technologies.
  - 1.2.1. Aspen Technologies does not perform design and development. It is therefore excluded from this QMS. Design and development are maintained by our customers (see section 7.3).

## **2. CONTINUOUS IMPROVEMENT, ISO 9000, AND OUR MANAGEMENT SYSTEM**

- 2.1. Our ISO 9001-based Quality Management System (QMS) has been developed in alignment with both our continuous improvement philosophy and our management system.
- 2.2. The QMS is that part of the overall management system which implements our quality policy, establishes procedures by which we meet or exceed customer expectations, and satisfies international system requirements for ISO 9001:2000 registration.

## **3. OUR COMPANY AND OUR PRODUCTS**

- 3.1. Aspen Technologies provides assembly and engineering services to a wide range of customers, including leading IC fabs and fabless semiconductor companies, as well as biomedical, MEMS, photonics, and start-up companies.
- 3.2. In support of this, Aspen Technologies purchases materials and services from its own suppliers to compliment customer-provided materials, in order to meet requirements for the production of our customers' devices.

## **4. QUALITY MANAGEMENT SYSTEM**

### **4.1. General Requirements**

This quality manual and its associated documents establish and define the means by which we implement, maintain and continually improve our QMS. They also identify the criteria and methods required to ensure effective operation and control of the system, and they identify the measurement, monitoring, analysis, information, and actions necessary to achieve planned results and continuous improvement.

The processes needed for our QMS include those identified in the ISO 9001:2000 standard, as well as a number of critical production processes. These processes and their sequences and interactions are identified in Appendix A: Key Processes and Interactions.

### **4.2. Documentation Requirements**

4.2.1. General

Our QMS documentation includes our quality policy (see section 5.3), quality objectives (see section 5.4.1), this quality manual, procedures and records required by the ISO 9001:2000 Standard, and other documents needed to ensure effective planning, operation and control of our processes.

4.2.2. Quality Manual

This manual includes:

the scope of the QMS (see section 1.2), including details of and justification for exclusions (see section 1.2.1) from the ISO 9001:2000 Standard

reference to the procedures established for the QMS (see section 9)

a description of the interaction between the processes of the QMS (see Appendix A: Key Processes and Interactions).

4.2.3. Control of Documents

All QMS documents are controlled.

This process is owned and managed by the Quality function; further details are included in procedure B1, Quality Processes.

4.2.4. Control of Records

All QMS records are controlled.

This process is owned and managed by the Quality function; further details are included in procedure B1, Quality Processes.

## 5. MANAGEMENT RESPONSIBILITY

5.1. Management Commitment

Executive management provides evidence of its commitment to the development, implementation, and continuous improvement of the Quality Management System (QMS) by:

communicating to the organization the importance of meeting customer, statutory and regulatory requirements

our quality policy (see section 5.3)

our quality objectives (see section 5.4.1)

conducting management reviews (see section 5.6)

ensuring the availability of resources through the establishment of the Quality department

5.2. Customer Focus

Our quality policy articulates our commitment to our customers' satisfaction. Customer expectations must be determined, understood, converted into requirements, and have processes designed to meet them in order to fulfill our quality policy on a daily basis.

5.3. Quality Policy

Aspen Technologies will facilitate our customer's success through excellence in services, at competitive prices, with on-time delivery and a commitment to the stewardship of our customer's product.

We achieve quality through the application, review and continual improvement of our *Quality Management System*, which is designed to meet or exceed customer, internal and regulatory requirements.

Our *Quality Management System* provides internal structure and accountability to quality initiatives throughout the organization, and is independently assessed for compliance to the international ISO 9001:2000 standard.

5.4. Planning

5.4.1. Quality Objectives

Executive management ensures that the following quality objectives, in order to meet requirements for product, are established at relevant functions and levels within the organization. These objectives are measurable and consistent with the quality policy.

The quality objectives, and the processes to which they apply, are as follows:

**Customer Satisfaction**

A minimum of 90% of quotes are to be delivered within the customer expectation window

A minimum of 90% of jobs are to be completed on-time

A minimum of 95% of jobs are to meet customer expectations or have a positive, ultimate, outcome

**Facilities, Maintenance, and Calibration**

100% compliance to preventive maintenance and calibration schedules

**Corrective and Preventive Action**

Containment action is to be completed within 1 working day

Corrective action is to be completed within 6 working days

### **Internal Auditing**

Each procedure level document is to be audited at a minimum of once per year

### **Safety**

Aspen Technologies will maintain a work-related injury and illness rate that is below the average for the semiconductor industry.

#### 5.4.2. Quality Management System Planning

Executive management ensures that the planning of the QMS is carried out in order to meet the requirements listed in section 4.1, as well as the quality objectives, and the integrity of the QMS is maintained when changes are planned and implemented.

#### 5.5. Responsibility, Authority and Communication

##### 5.5.1. Responsibility and Authority

Executive management ensures that responsibilities and authorities are defined and communicated within the organization.

For detailed information on current organizational structure and responsibilities, see the functional organizational chart.

##### 5.5.2. Management Representative

Executive Management has appointed a Quality Management Representative (see the functional organizational chart) who, irrespective of other responsibilities, has the responsibility and authority of:

ensuring that the processes needed for the QMS are established, implemented, and maintained

reporting to executive management on the performance of the QMS and any need for improvement

ensuring the promotion of awareness of customer requirements throughout the organization

##### 5.5.3. Internal Communication

Executive Management communicates the effectiveness of the QMS to all levels of the organization by the following communication processes:

documented training  
internal audit program  
corrective and preventive action  
regularly scheduled organizational meetings  
informal communications

## 5.6. Management Review

### 5.6.1. General

Executive management conducts a quarterly review of the QMS, to ensure its continuing suitability, adequacy, and effectiveness, as well as opportunities for improvement and the need for changes.

Records from management review meetings are maintained.

### 5.6.2. Review Input

The management review meeting includes the following topics:

Review of the Quality Policy

Outstanding Action Items

Audit Results

Customer Feedback

Process Performance and Product Conformity

Status of Corrective and Preventive Actions

Supplier Performance

Quality Objectives

Changes that could affect the Quality System

Recommendations for Improvement

### 5.6.3. Review Output

At a minimum, outputs from management review meetings include any decisions or actions related to improvement of the effectiveness of the QMS and its processes, improvement of product related to customer requirements, and resource needs.

## 6. RESOURCE MANAGEMENT

### 6.1. Provision of Resources

Executive Management has established the Quality department and conducts quarterly management reviews in order to ensure the resources needed to implement and maintain the QMS, continually

improve its effectiveness, and to enhance customer satisfaction by meeting customer requirements.

6.2. Human Resources

6.2.1. General

Personnel performing work affecting product quality are assessed for competency on the basis of appropriate education, training, skills, and experience.

6.2.2. Competence, Awareness and Training

We determine the necessary competence for personnel performing work affecting product quality, provide training, and evaluate training effectiveness. We also ensure that our employees are aware of the relevance and importance of their activities, and how they contribute to the achievement of the quality objectives.

Records of relevant education, training, skills, and experience are maintained.

See procedure C1, Human Resources Processes for more details.

6.3. Infrastructure

Aspen Technologies identifies, provides and maintains the facilities needed to achieve product conformance, including workspace and associated facilities, equipment (hardware and software), and supporting services.

See procedure H1, Facilities, Maintenance and Calibration Processes for more details.

6.4. Work Environment

Aspen Technologies determines and manages the work environment needed to achieve conformity to product requirements.

Systems are established to control atmospheric conditions in the clean rooms, such as air cleanliness, humidity, temperature, and proper smocking protocol in order to protect products from ESD damage or contamination.

In addition to providing competitive benefits, we encourage participation from all employees through our suggestion and rewards/ recognition program, internal job posting system, and an open-door policy.

**7. PRODUCT REALIZATION**

7.1. Planning of Product Realization

Aspen Technologies plans and develops the processes needed for product realization. Planning of product realization is consistent with the requirements of the other processes of the QMS.

In planning product realization, Aspen Technologies determines the following, as appropriate:

- quality objectives and requirements for the product;
- the need to establish processes, documents, and provide resources specific to the product;
- required verification, validation, monitoring, inspection and test activities specific to the product and the criteria for product acceptance;
- records needed to provide evidence that the realization processes and resulting product meet requirements

The output of this planning is assembly documentation, including but not limited to:

- travelers,
- specifications and product drawings,
- bills of materials,
- product-specific work instructions,
- fixture and tooling documents, and
- data collection forms.

## 7.2. Customer-Related Processes

### 7.2.1. Determination of Requirements Related to the Product

Aspen Technologies determines:

- requirements specified by the customer, including the requirements for delivery and post-delivery activities,
- requirements not stated by the customer but necessary for specified or intended use, where known,
- statutory and regulatory requirements related to the product, and
- any additional requirements.

### 7.2.2. Review of Requirements Related to the Product

Prior to committing to supply a product to the customer, Aspen Technologies conducts a review of the requirements related to the product to ensure that:

- product requirements are defined,

contract or order requirements differing from those previously expressed are resolved, and

we have the ability to meet the defined requirements.

Records of results and actions arising from the review are maintained.

Where the customer provides no documented statement of requirement, we confirm the customer requirements prior to acceptance.

Where product requirements are changed, we ensure that relevant documents are amended, and that the relevant personnel are made aware of the changed requirements.

#### 7.2.3. Customer Communication

Aspen Technologies determines and implements effective arrangements for communicating with customers in relation to:

product information

enquiries, contracts, or order handling, including amendments, and

customer feedback, including customer complaints.

#### 7.3. Design and Development

Aspen Technologies does not perform product design. Product design control is maintained by our customers, and is therefore excluded from our QMS.

#### 7.4. Purchasing

##### 7.4.1. Purchasing Process

We ensure that purchased products and services that impact the final quality of our products conform to our requirements.

This manual and its associated procedures establish the methods by which we control our purchasing process to ensure product conforms to requirements. The type and extent of control is dependent upon the effect of the item on subsequent realization processes and their output.

Suppliers are evaluated and selected based on their ability to supply product in accordance with our requirements. The results of evaluations and follow-up actions are recorded. Additionally, we maintain a record of approved suppliers. For more information, see procedure D1, Finance Processes.

##### 7.4.2. Purchasing Information

Purchasing documents contain the appropriate data to clearly and fully describe materials which are being purchased. When

appropriate, this includes requirements for approval or qualification of product, procedures, processes, equipment, and personnel, and QMS requirements.

We ensure the adequacy of specified purchase requirements prior to communicating them to our suppliers.

#### 7.4.3. Verification of Purchased Product

Inspection or other necessary activities are performed on all purchased products and services in order to verify they meet specified purchase requirements.

Should we or our customers choose to do perform verification at a supplier's premises, we will specify the intended verification arrangements and method of product release in our purchasing documents.

We ensure that product which does not conform to requirements is identified and controlled to prevent unintended use or delivery (see section 8.3).

### 7.5. Production and Service Provision

#### 7.5.1. Control of Production and Service Provision

Aspen Technologies plans and carries out production and service provision under controlled conditions. These controlled conditions include, as applicable:

- the availability of information that describes the characteristics of the product,
- the availability of work instructions, as necessary,
- the use of suitable equipment,
- the availability and use of monitoring and measuring devices,
- the implementation of monitoring and measurement,
- the implementation of release, delivery, and post-delivery activities.

#### 7.5.2. Validation of Processes for Production and Service Provision

Processes, in which the results cannot be verified by subsequent measurement or monitoring, are defined as "special processes". These include any processes where deficiencies may become apparent only after the product is in use or the service has been delivered. We validate these special processes by demonstrating their ability to achieve planned results.

When applicable, requirements for special process validation are carried out. These may include:

criteria for review and qualification of the processes,  
qualification of equipment and personnel,  
use of defined methodologies and procedures,  
and requirements for records and re-validation.

7.5.3. Identification and Traceability

Identification and traceability are critical in our industry. In order to ensure effective traceability, we control and record the unique identification of the product by lot number.

In addition, we offer tracing services for more detailed or specific customer requirements.

7.5.4. Customer Property

We exercise care with customer property (including intellectual property) while it is under our control and use. We identify, verify, protect, and safeguard customer property provided for use or incorporation into the product, applying the same process controls as we do with other material inputs to the process. Should any customer property be lost, damaged, or otherwise found to be unsuitable for use, the occurrence is communicated to the customer and addressed per our corrective and preventive action process (see section 8.5).

7.5.5. Preservation of Product

Aspen Technologies preserves the conformity of product during internal processing and delivery to customer. This preservation includes identification, handling, packaging, storage, and protection of product, as well as its constituent parts.

7.6. Control of Monitoring and Measuring Devices

Aspen Technologies determines the monitoring and measurement to be undertaken and the monitoring and measuring devices needed to provide evidence of conformity of product to determined requirements.

We establish processes to ensure that monitoring and measurement is carried out, and in a manner that is consistent with internal and customer requirements, as applicable.

Where necessary to ensure valid results, measuring equipment is:

calibrated or verified at specified intervals, or prior to use,  
against measurement standards traceable to international or  
national measurement standards;

where no such standards exist, the basis used for  
calibration or verification is recorded;

adjusted or re-adjusted as necessary;

is identified to enable the calibration status to be determined;  
is safeguarded from adjustments that would invalidate the measurement result;  
is protected from damage and deterioration during handling, maintenance and storage.

Our process for the control of measuring and monitoring devices, includes:

details of equipment type,  
unique identification,  
location,  
frequency of checks and check methods, and  
acceptable criteria.

We maintain appropriate records for all measuring and monitoring devices.

We assess and document the validity of previous inspection and test results when measuring and monitoring devices are found to be out of calibration. In addition, our corrective and preventive action process is used to address any such occurrences, in order to preclude recurrence (see section 8.5).

Software used for measuring and monitoring of specified requirements is validated prior to use.

For more information on our calibration program, see procedure H1, Facilities, Maintenance, and Calibration Processes.

## **8. MEASUREMENT, ANALYSIS AND IMPROVEMENT**

### 8.1. General

Aspen Technologies plans and implements the monitoring, measurement, analysis, and improvement processes needed:

to demonstrate conformity of the product,  
to ensure conformity of the QMS, and  
to continually improve the effectiveness of the QMS.

These processes include determination of applicable methods, including statistical techniques, and the extent of their use.

### 8.2. Monitoring and Measurement

#### 8.2.1. Customer Satisfaction

Customers are the reason we exist, so as a measurement of the performance of the QMS, we collect, monitor, and evaluate

information relating to customer perception and satisfaction in order to determine how well we are satisfying the objective of meeting customer requirements.

In addition, anyone receiving a complaint from a customer has the responsibility to initiate our corrective and preventive action process, to investigate the complaint and preclude recurrence of the issue (see section 8.5).

For more information on customer satisfaction, see procedure G1, Technical Sales and Marketing Processes.

#### 8.2.2. Internal Audit

Internal audits are critical to the success of our QMS. Held at planned intervals, our audits help us determine whether the QMS:

conforms to the planned arrangements, to the requirements of International Standard ISO 9001:2000, and to the QMS requirements we have established, and is effectively implemented and maintained.

Our internal audit program is planned, taking into consideration the status and importance of the processes and areas being audited, as well as the results of previous audits. Our audit program defines:

audit criteria,  
scope,  
frequency,  
methods,  
responsibilities and requirements for planning and conducting audits, and for reporting results and maintaining records.

Management responsible for the audited process or area is responsible to ensure that actions are taken without undue delay to eliminate detected nonconformities and their causes. Follow-up activities include verification of actions and reporting of results.

For more information on internal auditing, see procedure B1, Quality Processes.

#### 8.2.3. Monitoring and Measurement of Processes

We apply suitable methods for monitoring and, where applicable, measuring the QMS processes. These methods demonstrate the ability of the processes to achieve planned results. When planned results are not achieved, correction and

corrective action is taken, as appropriate, to ensure conformity of the product (see section 8.5).

#### 8.2.4. Monitoring and Measurement of Product

We monitor and measure characteristics of our product to verify the product requirements have been met. These actions are carried out at appropriate stages of the product realization process in accordance with the planned arrangements.

Evidence of conformity with the acceptance criteria is maintained. Records indicate the person(s) authorizing release of product.

Product release and service delivery does not proceed until the planned arrangements have been satisfactorily completed, unless otherwise approved by the customer or another relevant authority.

#### 8.3. Control of Nonconforming Product

We ensure that product which does not conform to requirements is identified and controlled to prevent unintended use or delivery.

Aspen Technologies deals with nonconforming product using one or more of the following actions:

- by taking action to eliminate the detected nonconformity;

- by authorizing the product's use, release, or acceptance under concession by a relevant authority and, where applicable, by the customer;

- by taking action to preclude its original intended use or application when placed in a designated segregation area.

Records of the nature of nonconformities and any subsequent actions taken, including concessions obtained, are maintained.

When nonconforming product is corrected, it must pass re-verification to demonstrate conformity to the requirements.

When nonconforming product is detected after delivery, or use has started, Aspen Technologies shall take appropriate actions to the effects, or potential effects, of the nonconformity.

#### 8.4. Analysis of Data

We define, collect, and analyze appropriate data to determine or demonstrate the suitability and effectiveness of our QMS, and to identify opportunities for continuous improvement. The analysis of data provides information relating to:

- customer satisfaction,

- conformance to customer requirements,

characteristics and trends of processes and products, including opportunities for preventive action, and supplier performance.

8.5. Improvement

8.5.1. Continual Improvement

At Aspen Technologies, continual improvement is a planned activity. We accomplish improvement through the use and review of our quality policy, quality objectives, audit results, data analysis, corrective and preventive actions, and the management review process.

8.5.2. Corrective Action

We take action to eliminate the cause of nonconformities, when possible, in an effort to prevent recurrence. Corrective actions taken are appropriate to the effects of the nonconformity encountered.

Our corrective and preventive action process defines requirements for:

- reviewing nonconformities (including customer complaints),
- determining the causes on nonconformities,
- evaluating the need for action to ensure that nonconformities do not recur,
- determining and implementing action needed,
- records of the results of action taken, and
- reviewing corrective action taken.

8.5.3. Preventive Action

We take action to eliminate the causes of potential nonconformities, when possible, in an effort to prevent their occurrence. Preventive actions taken are appropriate to the effects of the potential problems.

Our corrective and preventive action process defines requirements for:

- determining potential nonconformities and their causes,
- evaluating the need for action to prevent occurrence of nonconformities,
- determining and implementing action needed,
- records of the results of action taken, and

reviewing preventive action taken.

**9. SUPPORTING DOCUMENTATION**

- 9.1. Procedure B1, Quality Processes
- 9.2. Procedure C1, Human Resources Processes
- 9.3. Procedure D1, Finance Processes
- 9.4. Procedure E1, Manufacturing Key Processes
- 9.5. Procedure E2, Manufacturing Support Processes
- 9.6. Procedure F1, Engineering Processes
- 9.7. Procedure G1, Technical Sales and Marketing Processes
- 9.8. Procedure H1, Facilities, Maintenance, and Calibration Processes
- 9.9. Procedure J1, Health, Safety, and Environmental Processes
- 9.10. Procedure K1, Technology and Export Control Processes

**10. REFERENCES**

- 10.1. ISO 9001:2001 International Standard

**APPENDIX A: KEY PROCESSES AND INTERACTIONS**

