Chapter 1 Quality Policy and Quality Strategies

Quality Policy

In accordance with the basic commitment of KIOXIA Corporation (the Company) based on doing the living of people wealthily and widen social possibility by continuing reclaiming the advanced memory technology and service, providing the product which of high quality, considered security, environment adapting to customer requirements by a creative technique and continuous value pursuit, pledges the following quality policy for our products and we will thoroughly ensure that all employees are aware of this policy.

1. We comply with laws and regulation requirements related to memory products, applied products, and related software products and produce the products which meet the quality reliability that the customer requires.

2. We perform manufacturing of quality in a mass production stage from a design and development stage and employees work on the improvement of securing of product security, consideration to environment and the technical level positively.

3. We aim for essential improvement by pursuing root cause s and continually improve the quality management system.
Chapter 1 Quality Policy and Quality Strategies

Quality Strategies

The following quality strategies are used by KIOXIA Corporation (the Company) in order to effectively promote its quality assurance activities and improve product quality and reliability:

1. Integrate quality and reliability during the design phase (Designed-in Q & R)
   The following steps are taken to integrate highly reliable technologies in the design phase:
   1) Enhance DR/AT (Design Review/Approval Test).
   2) Develop evaluation and analysis techniques in support of leading-edge technology.
   3) Use prevention methods (FMEA/ study of failures, etc.) in an effort to improve design quality and reliability.

2. Integrate quality and reliability in manufacturing processes (Built-in Q & R)
   To integrate quality and reliability in processes by source management, we:
   1) accumulate manufacturing know-how and strive to improve processes management, etc.
   2) actively use the SPC (Statistical Process Control) method to reduce causes of fluctuations.

3. Improve quality through failure detection and analysis improvement (Improvement)
   To assure the quality of shipped products, we:
   1) monitor product quality by initial quality inspection, manufacturing process data, and periodic reliability tests; and
   2) continue to make efforts to improve analytical techniques in order to increase the probability of identifying causes of failure; and
   3) investigate the causes of defects through failure analysis and incorporate this as feedback in processes.

4. Total customer service (Customer satisfaction)
   The following steps are taken to meet market quality requirements and improve customer satisfaction:
   1) Actively feed back the various customer quality requirements to the manufacturing and design processes.
   2) Provide sufficient information services.
Chapter 2 Quality Integration

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1. Quality Assurance System (Quality Assurance Organization Overview)

1-1. Quality Assurance Organization

Figure 2-1-1 shows the Company's quality assurance organization overview to explain the overall quality assurance activities.

In Figure 2-1-1, the President of the company operates the company's quality assurance meeting concerning overall quality assurance (quality management systems and quality risk management systems) at the Company with members including the Division Managers and Technology Executives through the Chief Quality Executive and Representative Director, and strives to maintain and improve the overall quality assurance system.

The Quality Planning Department formulates basic policies and regulations for overall quality assurance and plans, supervises, and promotes overall quality assurance activities.

The Division Quality Department strives to maintain and improve the quality and reliability of developed products. It conducts concrete activities to resolve the complaints of customers and quality problems and constantly gathers and analyzes market quality information and provides feedback to related departments. In addition, Division Quality Assurance Meetings are held by the Division General Manager in an effort to improve the overall quality assurance system.

The Plant Quality Assurance Department strives to maintain and improve the quality and reliability of Plant products. The department is responsible for the quality assurance of incoming parts and materials, quality assurance of the manufacturing process, quality and reliability assurance at the time of shipping, post-shipping quality services. In addition, Plant Quality Assurance Meetings are held by the plant General Manager in an effort to improve the overall quality assurance system.
1. Quality Assurance System (Quality Assurance Procedure)

1-2. Quality Assurance Procedure

The company makes every effort to understand customer needs and incorporate into product design the quality and reliability required by the conditions under which the products will be used by customers. In the design review (DR) phase, the products are checked by each department, paying due attention to factors such as product safety and product liability.

For products under development, the company conducts a quality and reliability evaluation based on the company reliability test standards compliant with standards such as JIS, JEITA, IEC, ANSI and JEDEC, and conducts a Design Approval Test (DAT).

If a product passes the Design Approval Test (DAT), the Engineering Department standardizes the parts and materials as well as the process and inspection plans. In addition, detailed Plant standards regarding the work to be performed are developed in the Plant where the products are to be made in mass production. A Quality Approval Test (QAT) is then conducted to evaluate the quality and reliability of sample products of mass production manufactured based on these standards. If the product quality and reliability are approved, the Plant will be put in charge of quality assurance for the actual production process.

During mass production, the Manufacturing Department carries out process, environment and facility management, and the Reliability Engineering Department carries out acceptance inspections, change control, measurement control, regular reliability confirmation and process audits. Departments such as the Manufacturing Engineering and Production Engineering Departments also join in problem solving and in improvement and automation of manufacturing processes.

If any modification is made on products after produced in volume, a Production Approval Test (PAT) is conducted and the result is returned to the manufacturing process.

At the time of shipment, the Quality Assurance Department monitors product quality by initial quality inspection as well as reliability testing and monitoring. Furthermore, in customer related quality services such as specification development, quality and reliability meetings, and defect investigation and reporting, the company continually strives to satisfy its customers with prompt action.

Figure 2-1-2 Quality Assurance Procedure for Semiconductor Products
2. Quality and Reliability in Product Development and Design Changes

Overview
The company semiconductor products are manufactured for a variety of applications, from consumer products to general industrial goods, automobiles. This section describes the system for developing products of high quality and reliability, from product planning to mass production.

2-1. Planning
When developing a new semiconductor product, first and foremost sufficient market research must be performed to ensure that the product satisfies customer objectives and the required quality and reliability, and to ensure the product's general marketability. The company classifies its products, according to customer applications, into two groups: general-product and high-reliable product which are graded on quality.

The Sales Department, Application Engineering Department and Quality Assurance Department thoroughly survey the type and actual operating environment of the device in which the product will be used. Circuit conditions, target reliability, design derating, operation conditions and maintenance control are also investigated, in addition to initial functionality and component failure rates. They then determine the specifications for development that incorporate the target reliability and subsequently formulate the development plans.

2-2. Development Design
The quality of semiconductor products depends largely on the design. Product design is based on development specifications carefully studied during the planning phase. Circuit, layout, process and structural designs of sufficient design tolerances are comprehensively considered so as to allow variance in processes and to achieve a design with integrated reliability.

To ensure design quality, a design review is held to deliberate the design from every perspective, confirming factors such as design standards, rules and safety. Design review participants include departments such as Development and Design, Manufacturing Engineering, Application Engineering, and Quality and Reliability. When a problem arises, a design review is conducted.

After the design review, a characteristics evaluation mainly designed to verify target characteristics and functions is performed using trial products, and a design approval test (DAT) is conducted with an emphasis on accelerated testing to verify target quality and reliability under actual re surveyed and analyzed from every point of view of failure physics to determine the cause, and the results are fed back to the design and manufacturing departments so as to improve quality and reliability.

After completion of the above evaluations, a DAT review meeting is held and, once approval is obtained, the trial production phase is entered.

2-3. Trial Production Approval
During the trial production approval phase, quality and reliability evaluations are conducted to maintain the designed quality and reliability and ensure continued stable production, and a quality approval test (QAT) is conducted to identify process capability, i.e., variations and yields, from the viewpoint of initial flow control.
Based on the evaluation results, the standards used are assessed with respect to appropriateness and information feedback is improved.
Product instructions, QC process charts and other work standards required for production are then prepared, and measurement instruments for manufacturing equipment, jigs and tools are adjusted. After these, evaluation will be conducted with trial samples.
Lastly, a QAT review meeting is held to review the above items and, once approval is obtained, a production transfer meeting is held and the mass production phase is entered.
2-4. DR/AT System
The company develops products using the Design Review/Approval Test (DR/AT) system.

Design Review (DR) System
At the end of the design phase, a design review is held with the participation of the Development and Design, Manufacturing Engineering, Application Engineering, and Quality Assurance departments. During the meeting, design standards, design rules (including studies of past incidents), and Contractual Liability/Product Liability (CL/PL) items are confirmed and the evaluation standards that take into consideration the various elements that affect the application, quality and reliability of the trial product are deliberated from various angles, based on departmental knowledge collected using independently developed design review check sheets. In particular, due attention is paid to the confirmation of safety, taking into consideration international safety standards (UL, VDE and others) as well.

The design review results are used as a basis for redesign and for measures such as the addition of AT test items.

Approval Test (AT) System
The approval test (AT) is performed after completion of the design review. First, the engineering grade of the product is assessed and then various evaluations and tests are conducted according to the grade. Table 2-2-1 lists the engineering grades and corresponding AT classifications. In addition, a reliability test by product family unit such as the design/process family or package family is conducted to effectively implement the AT. For details, see the chapter on Reliability Testing in the Reliability Handbook.
2. Quality and Reliability in Product Development and Design Changes

2-5. Change Control

Semiconductor products are continually improved so as to enhance performance, decrease size, reduce cost, and improve manufacturability (such as better stability and efficiency). Changes for such improvements require detailed product evaluation and process control so as to maintain and improve quality and reliability.

The previously described evaluation and design review/approval test (DR/AT) system checks and evaluates improvements and changes, preventing quality problems which may arise in association with such improvements and changes.

If a change or improvement requires modification to product structure, functionality or characteristics, or will have a significant effect on reliability, customer approval is obtained in advance. The company has established the change control system as shown to the right for this purpose.

Figure 2-2-2 Change Control Procedure
3. Control of Parts, Materials and Subcontracting

3-1. Parts and Materials

The assurance of high-quality parts and materials for the manufacturing process is essential to continued stable production at the designed levels of quality and reliability. Therefore, the specifications and required quality standards for parts and materials are clearly defined in the manufacturing design phase. This information is used in the incoming parts and materials inspection and approval process (in the case of chemicals, periodic analysis).

We carry out a number of different measures to ensure thorough management of parts and materials procured from outside vendors. We achieve this through a quality assurance agreement with outside vendors, systemization of the quality assurance implementation plan, guidance and education for quality control (trend management, etc.), management guidance based on the ISO 9000 Series, and periodic process auditing.

Regarding the environment, we are promoting green procurement. For details on green procurement, please refer to the chapter on Environmental Activities. In addition, parts and materials are stored in an appropriate environment in accordance with established rules to prevent deterioration over time and assure quality. For details, see the chapter on environmental measures.

| Table 2-3-1 Procedure for Authorizing New Outsourcers/Parts and Materials Manufacturers |
|---|---|---|
| Item | Description | Main responsible department |
| (1) New Outsourcers/Parts and Materials Manufacturers Specifications Meeting | We meet with new outsourcers/parts and materials manufacturers based on the purchase specification prepared by Toshiba regarding the parts and materials concerned. | Engineering Department |
| (2) Selection of Outsourcers/Parts and Materials Manufacturers | We take quotations, technology, quality level, specifications, etc. into consideration when selecting outsourcers/parts and materials manufacturers. | Engineering Department, Procurement Department |
| (3) Prototypes | We order the prototype and confirm the technology and quality levels. | Engineering Department |
| (4) Contracts | We conclude the "basic contract." | Procurement department |
| (5) Primary Approval | We confirm that the parts and materials concerned satisfy the required functions. | Engineering Department |
| (6) AT Implementation | We make sure that the parts and materials concerned possess sufficient quality and reliability when used in products. | Engineering Department |
| (7) Executing the purchase specification | We execute specifications for purchased parts. | Procurement department |
| (8) Manufacturer Approval | We audit the manufacturer’s outsourcer’s/parts and materials manufacturer’s quality assurance system and production line and confirm that products of sufficient quality are ready for mass production. | Quality Assurance Department, Procurement Department |
| (9) Secondary Approval | We confirm that the quality level of the parts and materials concerned is at the same level as the primary approval result, including variations. | Quality Assurance Department, Procurement Department |
| (10) Executing the "Quality Assurance Agreement" | As a rule, outsourcers/parts and materials manufacturers are to sign the "Quality Assurance Agreement." | Quality Assurance Department, Procurement Department |

Figure 2-3-1 Example of Supplier Management
3. Control of Parts, Materials and Subcontracting

3-2. Subcontracting (Outsourcing)

When selecting an outsourcee to do part of the semiconductor product manufacturing process, items such as QC, management, technology and facilities are investigated and confirmed.

After production starts, support is provided to aid outsourcees in quality and engineering training and guidance and in facility planning. In addition, periodic quality audits are performed to check the process control and environment status. Furthermore, outsourcee quality meetings are held periodically to obtain action plans for items reported during quality audits, to verify the status of other quality items, and to provide guidance in quality improvement. Such continual improvement activities maintain and improve quality. Table 2-3-2 shows an example of an outsourcee control plan and its implementation. Figure 2-3-2 shows an example of outsourcee control.

<table>
<thead>
<tr>
<th>Planning</th>
<th>Implementation</th>
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<tbody>
<tr>
<td>(1) Outsourcee selection</td>
<td></td>
</tr>
<tr>
<td>(a) Management survey</td>
<td>Production</td>
</tr>
<tr>
<td>(b) Engineering status survey</td>
<td></td>
</tr>
<tr>
<td>(c) QC status survey</td>
<td></td>
</tr>
<tr>
<td>(d) Facility and other surveys</td>
<td></td>
</tr>
<tr>
<td>(2) Outsourcee quality control</td>
<td>QA</td>
</tr>
<tr>
<td>(3) Outsourcee technology guidance</td>
<td>Manufacturing</td>
</tr>
<tr>
<td>(4) Outsourcee evaluation</td>
<td>QA</td>
</tr>
</tbody>
</table>
4. Manufacturing Process Control

4-1. Facilities

The company establishes facility control regulations to guide the improvement and expansion of production facilities and the implementation of facility safety control. To maintain functionality, facility control incorporates the concept of total productive maintenance (TPM) whereby specific methods, such as facility inspections at the beginning of work, are defined and self-imposed/planned safety measures and inspections are implemented with the aim of identifying quality problems before they occur and stabilizing quality.

4-2. Working Environment

The quality and reliability of semiconductor products depends largely on the work environment of manufacturing processes. Cleanliness, temperature, humidity, and static electricity, in particular, require strict control.

The Company clean rooms are controlled to the level required. To maintain and improve a clean room, dust is monitored and the source of the dust is periodically analyzed and controlled. In addition, temperature and humidity are monitored and controlled as specified.

The purity of the ultra pure water used in great amounts in the wafer process also greatly affects the quality and reliability of semiconductor products. Therefore, the water is purified using methods such as ion exchange and micron filtering, and the result is monitored and analyzed periodically.

Furthermore, the miniaturization and an increasing variety of packaging has led to a growing problem with device failure due to electrostatic discharge (ESD). The Company has therefore created guidelines for controlling ESD effectively, particularly during the assembly process.
4. Manufacturing Process Control

4-3. Process Control

Semiconductor products are formed through a combination of component processes that include wafer processing including oxidation, diffusion, deposition, pretreatment, etching, ion implantation and photolithography, and assembly processing including dicing, die bonding, wire bonding and molding.

SSD products are formed mainly through component mounting and testing processes. The processes are controlled through an online system (travel sheet is used for some processes), and the production record including the conditions, processing start and end time, instruments used, workers, actions during failures for each is clearly recorded.

Figure 2-4-1 Example of Memory QC Process Diagram

Figure 2-4-2 Example of SSD QC Process Diagram

<table>
<thead>
<tr>
<th>Manufacturing process</th>
<th>Flow chart</th>
<th>Name of process, materials, inspection</th>
<th>Items controlled</th>
</tr>
</thead>
<tbody>
<tr>
<td>wafer</td>
<td>▼</td>
<td>Inspection report</td>
<td></td>
</tr>
<tr>
<td>Film</td>
<td>□</td>
<td>Thickness, appearance</td>
<td></td>
</tr>
<tr>
<td>Backside grinding</td>
<td>□</td>
<td>Appearance</td>
<td></td>
</tr>
<tr>
<td>Dicing</td>
<td>□</td>
<td>Appearance</td>
<td></td>
</tr>
<tr>
<td>Substrate</td>
<td>□</td>
<td>Appearance</td>
<td></td>
</tr>
<tr>
<td>Die bonding (NAND 1, 2, 3, 4)</td>
<td>□</td>
<td>Position, appearance</td>
<td></td>
</tr>
<tr>
<td>Wire</td>
<td>□</td>
<td>Inspection report</td>
<td></td>
</tr>
<tr>
<td>Wire bonding (NAND 1, 2, 3, 4)</td>
<td>□</td>
<td>Bonding strength, loop height, appearance</td>
<td></td>
</tr>
<tr>
<td>Die bonding (NAND 5, 6, 7, 8)</td>
<td>□</td>
<td>Position, appearance</td>
<td></td>
</tr>
<tr>
<td>Wire bonding (NAND 5, 6, 7, 8)</td>
<td>□</td>
<td>Bonding strength, loop height, appearance</td>
<td></td>
</tr>
<tr>
<td>Mold resin</td>
<td>□</td>
<td>Inspection report</td>
<td></td>
</tr>
<tr>
<td>Mold</td>
<td>□</td>
<td>Temperature, wire flow, appearance</td>
<td></td>
</tr>
<tr>
<td>Solder ball</td>
<td>□</td>
<td>Inspection report</td>
<td></td>
</tr>
<tr>
<td>Ball mount</td>
<td>□</td>
<td>Temperature profile, bonding strength, appearance</td>
<td></td>
</tr>
<tr>
<td>PKG dicing</td>
<td>□</td>
<td>Dimensions, appearance</td>
<td></td>
</tr>
<tr>
<td>marking</td>
<td>□</td>
<td>Confirmation of mark contents</td>
<td></td>
</tr>
<tr>
<td>Test</td>
<td>□</td>
<td>Electrical characteristics</td>
<td></td>
</tr>
<tr>
<td>Ball scan</td>
<td>□</td>
<td>Dimensions</td>
<td></td>
</tr>
<tr>
<td>Appearance inspection</td>
<td>□</td>
<td>Appearance</td>
<td></td>
</tr>
<tr>
<td>Bake</td>
<td>□</td>
<td>Temperature, time</td>
<td></td>
</tr>
<tr>
<td>Packaging materials</td>
<td>□</td>
<td>Appearance</td>
<td></td>
</tr>
<tr>
<td>Packaging</td>
<td>□</td>
<td>Appearance, quantity</td>
<td></td>
</tr>
<tr>
<td>Shipment</td>
<td>□</td>
<td></td>
<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Process illustration symbol</th>
<th>▽: Storage, □: Processing, □: Comprehensive inspection, ○: Check</th>
</tr>
</thead>
<tbody>
<tr>
<td>Manufactured process</td>
<td></td>
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</tbody>
</table>

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5. Identification and Traceability

5-1. Processes

To control materials in processes and clearly define manufacturing history, The Company employs the following identification control methods:
Storage racks and containers for materials, semi-finished, finished, repaired and returned products are identified by shape, color and signage to ensure that the storage and processing status of each item is clearly understood.
At manufacturing process inspections and final inspections, the inspection status (before inspection, inspection in progress, inspected) is marked so that it is clearly understood.
The process history of lots located amidst manufacturing processes is clearly defined using travel sheets and check sheets.

5-2. Products

Product identification is controlled by marking production lot codes to products so that the manufacturing history of any product can be traced. The figure to the right shows the typical The Company production lot code assignment method.
The manufacturing history can be traced from the The Company control trace code (production lot code) printed on the internal carton box label and weekly code. If the production lot code is not possible to mark due to restrictions for package size, manufacturing history for the product is traced from the internal carton box label’s The Company control trace code and weekly code.

For SSD, the manufacturing history can mainly be traced from the The Company control trace code printed on the internal carton box label and the serial number of the product label.
6. Action at the Time of Failure

For defects in the manufacturing process, parts, or products, we investigate the cause and confirm the affecting range, and promptly treat the target products, parts, and processes using the path shown in Figure 2-6-1.

If the defects discovered during the process extend to products that have already been shipped, we will promptly contact the customer and take care of the product.

In addition, we conduct a root cause investigation and carry out corrective actions and preventive actions, including quality system changes. Depending on the details, we perform corrective actions and preventive actions after obtaining prior approval from the customer.

After corrective and preventive actions are taken, we confirm the effect and verify the details of their implementation. This series of details is reported to relevant departments and kept as quality records, and is deployed horizontally as necessary to prevent recurrence.

Figure 2-6-1 Flow of Action at the Time of Failure
We use statistical methods for each process, quantitatively analyze the variation affecting quality, and use the results to improve quality.

Specifically, using methods such as FMEA as shown in Figure 2-7-1, we determine the critical control items based on those that affect quality and reliability, had serious trouble in the past, correlate with defect mechanisms, etc.

Based on that, we investigate the capabilities of each process, carry out process improvement on items with a poor process capability index level, and perform continuous quality improvement activities. A computer integrated manufacturing (CIM) system is employed to improve data entry efficiency and enhance Statistical Process Control (SPC) effectiveness.

Furthermore, educational curricula are incorporated in training to promote the use of statistical methods among operators and engineers, so as to broaden the use of SPC and further improve quality.
8. Product Shipment Quality Assurance

To guarantee the quality and reliability of semiconductor products, it is important to incorporate quality and reliability in the products during the design and manufacturing stages. We conduct all electrical characteristics inspections in the manufacturing process to confirm that there is no omission in quality control at each stage and to ensure the quality and reliability of the final products.

We also regularly monitor quality and reliability levels. Quality monitoring is used to verify the initial electrical characteristics and appearance of randomly selected sample products. This process assures the quality and reliability of shipped products. On the other hand, reliability monitoring is used to verify the reliability level based on the end product process or package family type. Changes in quality/reliability levels are reflected in the establishment of target failure rates, thereby aiding in quality and reliability level maintenance and improvement of the manufacturing process.

The Company further improves quality and reliability levels in an aim for a level of quality and reliability that will satisfy customers.

![Figure 2-8-1 Inspection Procedure](image1)

![Figure 2-8-2 Quality and Reliability Level Confirmation Procedure](image2)
9. Logistic Quality Management System

The Company has established an original logistic system, which offers just-in-time delivery to customers. The Company warehouses across the world comply with the common standards of quality control. The Company logistics with unified control offers transportation system that satisfies customers. The products manufactured in factories are distributed according to the company logistics and delivered to the right customers as per order. Furthermore, in order to enhance collective distribution quality, The Company has made an effort to improve package management and transportation management.

9-1. Package Management

From various viewpoints including consideration for global environment, we believe that the protection of products and packages in transits against various damages, and ensuring of product quality and reliability, management of package materials and specification is important. Thereby, The Company manages product packages based on the following two points:

Firstly, out of consideration to global environment, The Company promotes the selection and use of package materials based on the The Company Green Procurement guideline and that satisfy the 3Rs (Reuse, Reduce, and Recycle).

Secondly, various characteristics evaluations including finish, sizing, mass, and electrical characteristics and verification through are transportation tests conducted to ensure the prevention of damage towards products in transits and product quality and reliability. Also, considering support for customers’ equipment that will incorporate or process The Company products, The Company has been promoting use of package materials that comply with JEITA/IEC standards in order to share types of package materials in common with other semiconductor manufacturers.

9-2. Logistic Quality Improvement

The Company manages logistic quality in accordance with management points listed in Table 2-9-1 Points in Logistic Quality Management System. The management criteria are stipulated in order to avoid product degradation in quality. By automating logistic system, The Company makes an effort on upgrading detection capability of product mishandlings due to mistakes, like wrong labeling, that are made in logistic process.

The Company has promoted improvement on processing of individual claims from customers. To satisfy customers’ claims, the lot tracing system has been used two-dimensional code, which enhances inspection accuracy. Furthermore, The Company has promoted enhancement of logistic quality by establishing the check system in various ways like introduction of logistic management system that is compliant with ISO9001 and ISO/IATF16949 and supply chain management (SCM) system.

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Cause of Quality Degradation</th>
<th>Possible Problem</th>
</tr>
</thead>
<tbody>
<tr>
<td>Storage</td>
<td>Temperature, humidity, dust</td>
<td>Discoloration, deformation of packages, contamination</td>
</tr>
<tr>
<td>Handling</td>
<td>Mishandling (Impacts like dropping products and mishandling of sheets and forms)</td>
<td>Deformation of packages, contamination, mislabeling</td>
</tr>
<tr>
<td>Delivery</td>
<td>Vibrations and impacts</td>
<td>Deformation of packages, contamination</td>
</tr>
<tr>
<td></td>
<td>Transportation</td>
<td>Destination errors, stowage control errors, delays in delivery</td>
</tr>
</tbody>
</table>

Table 2-9-1 Points in Logistic Quality Management
# Chapter 3 Common Support Systems

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<td></td>
<td>2-2. Document Control System</td>
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<td>3. Measurement Control</td>
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<td>4. Internal Quality Audit</td>
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<td>5-2. Analysis flow</td>
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<td>6. Specifications and Quality Agreements</td>
<td></td>
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<tr>
<td>7. ISO/IATF Certification Information</td>
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</tbody>
</table>
1. Education and Training

The Company provides education and training programs for each level and position, including programs for new employees, general employees, supervisory manager and corporate managers.

Constructive quality-related education and training is carried out based on curricula designed to maintain and improve product quality and proactively promote quality control. Figure 3-1-1 shows a quality-related education system example. Two types of education and training courses are offered: those for engineers engaged in manufacturing, engineering or quality assurance and for onsite supervisors.

Courses for engineers cover a wide range of quality control education that takes into consideration the student’s level of knowledge and experience.

To manufacture stably high-quality and reliable semiconductors, each manufacturing department provides basic and specialized education related to semiconductor manufacturing periodically and on an as-needed basis to operators, using the qualification system shown in Figure 3-1-2.

The process of qualifying personnel for particular tasks in this way raises and equalizes the skill levels of employees, helping to stabilize quality.
2. Document Control

2-1. Standardization System
The Company standards are controlled at every phase, from design to manufacturing, using an internal network system. A procedural flow is established that ensures that these standards are issued efficiently and without fail.

In addition, rules for as-needed revision and abolishment have been set so that the standards prepared are effectively utilized at all times. Figure 3-2-1 shows how The Company standards are organized.

2-2. Document Control System
Documents and data are controlled as follows:

Performance, quality and reliability standards required by the customer and items related to quality assurance that appear in customer specifications are integrated into the standardization system as custom specifications and made known to the departments concerned to ensure appropriate utilization and proper reflection in manufacturing. (See Figure 3-2-1.)

In addition, this information is strictly controlled to ensure confidentiality.

A controlling department for quality-related documents and data is clearly identified so that the information can be effectively utilized with applicable standards. Such information includes internal approval documents and data, reliability test data and process audit records.

The retention period for these documents and data is prioritized according to the criticality of the contents and controlled in such a manner that ensures storage for the appropriate period of time.

Figure 3-2-1 Standards Organization
Measurement control regulations have been established to guide the control and use of measuring instruments. The Company uses calibration instruments regulated by law that have been inspected and approved by authorized agencies. These instruments are periodically inspected and the results are filed and maintained. The Measurement Administrator has the responsibility and authority over management of this process.

Semiconductor manufacturing is a field that involves very small dimensions for which there are no national standards. In such cases, The Company standards are formulated in cooperation with measurement device manufacturers and overseas agencies, enabling tracing to the standard calibration instrument of each process. Figure 3-3-1 shows the instrumentation accuracy traceability system.

Procurement calibrations and inspections, periodic calibrations and inspections and spot calibrations and inspections are performed on instrumentation. The related log books and slips are managed by the Measurement Administrator. Approved instruments are identified by a seal which indicates the effective period and the next inspection date. Approved instruments are identified by a seal which indicates the effective period and the next inspection date.

In addition, the department that owns an instrument is responsible for daily management based on control standards.

Figure 3-3-1 Traceability System Diagram for Measuring Instruments
4. Internal Quality Audit

To maintain and improve the overall quality assurance system and activities and maintain and improve product quality and reliability, an audit team conducts periodic audits on each target business process, evaluates the appropriateness, adequacy, and effectiveness of the items checked, and provides advice on, recommends, or requests remediation or improvements. Table 3-4-1 describes the main internal quality audit types and content.

Table 3-4-1 Main Internal Quality Audit Types and Content

<table>
<thead>
<tr>
<th>Type</th>
<th>Target</th>
<th>Auditor</th>
<th>Frequency</th>
<th>Items Checked</th>
</tr>
</thead>
<tbody>
<tr>
<td>Internal quality audit</td>
<td>Departments within scope of authentication Staff, Sales Engineering Dept., Manufacturing Dept., Production Dept., QA Dept., Other</td>
<td>Audit team (Those who have completed the required training)</td>
<td>Once a year</td>
<td>Verification of suitability and effectiveness for ISO9001/IATF16949 requirements · ISO: systems audit, process audit (optional) · IATF: systems audit, manufacturing process audit, product audit</td>
</tr>
<tr>
<td>QS audit (Quality &amp; Safety)</td>
<td>Division</td>
<td>QA Dept. Manager Technology Executive Legal Affairs Dept. Manager</td>
<td>Once a year</td>
<td>· Overall quality assurance system, document control · Design approval mechanism, critical process control items · Identification and audit of contracts with suppliers · Manufacturing change control/failure control, shipment quality · Effectiveness of corrective action for quality incidents, etc.</td>
</tr>
</tbody>
</table>
5. Customer Support

5-1. Customer Quality Support

Overview
The Company has established a system whereby the increasingly diverse customer quality requirements and customer satisfaction levels after product shipment are clearly identified and fed back to processes and design departments so as to ensure continual response to market quality requirements.

Quality Information Services
The Company prepares the following information and materials to offer support in every phase, including the phases of product approval by customer, incoming inspection and assembly.

This information can be provided promptly upon customer request.

1. Reliability data
2. Quality materials including QC process diagrams
3. Environmental data
   Other

Quality Communication Meetings
Periodic quality communication meetings attended by customers and Quality Assurance Department members are held to maintain a relationship of trust with customers.

In the meetings, the customer is provided a high level of support through information exchange and reports on defects, preventive measures and plans for improvement.

To satisfy customer expectations concerning the quality level and to maintain and further improve product quality, The Company has adopted a proactive system of cooperation, ensuring that the detailed information that cannot be checked on a daily basis is checked and that mutual goals are achieved.

Customer Support on Failures
We support customers when a failure arises. We will explain further in the following section.

Collecting Information from Customers and Feedback
The Company utilizes the delivery specifications and quality contracts that state customer requirements, failure information from customers, customer testimonies obtained from various venues such as quality communication meetings as well as the results of customer satisfaction surveys conducted by a third party to further improve customer satisfaction and obtain customer trust.
5. Customer Support

5-1. Customer Support on Failures

Through the in-house electronic system from the Sales Department, failure information from customers is quickly conveyed to the Plant Quality Assurance Department in charge of manufacturing and the Quality and Reliability Engineering Department in the Division. Both departments in cooperation conduct tracing of product information, confirmation of the actual product, failure analysis, etc. They also examine investigations and countermeasures with manufacturing and engineering Departments, and submit deliveries of corrected products and failure information, etc. In addition, failure information is fed back to relevant departments in charge of the manufacturing process, etc. to prevent recurrence and is used to improve quality and reliability.

Figure 3-5-1 Customer Support Channel on Failures
5-2. Analysis flow

Figure 3-5-2 shows a general failure analysis flow chart for a memory product. Basically, after acquiring a defective semiconductor product, we perform an appearance inspection and initial electrical characteristic evaluation, and report on the results of the reproducibility check of the failure mode. We will perform a more detailed evaluation and present an interim report as necessary. We then continue to identify the cause of the failure and make the final report, including countermeasure proposals, etc.

Refer to the “Reliability Handbook” for each analysis example.

Figure 3-5-3 shows a general failure analysis flow chart for an SSD product. After acquiring a defective product, we perform an appearance inspection, initial electrical characteristic evaluation, and internal log investigation to check for the presence of an abnormality. (Primary level defect analysis) We will perform a more detailed evaluation on the SSD level to identify the cause of the defect and present an interim report as necessary. (Secondary level defect analysis)

If a part is defective, we will conduct a defect analysis together with the parts supplier and identify the cause of the defect. (Third level defect analysis)

Lastly, we will make the final report, including countermeasure proposals, etc.
6. Specifications and Quality Agreements

Customer requirements for performance, quality and reliability standards and other items related to quality assurance are clearly defined in the delivery specifications or quality contract. In this way, every effort is made to maintain and improve quality assurance matters that ensure customer satisfaction.

A specification issuance control system is employed to ensure that specifications are issued in a streamlined manner and controlled with absolute certainty. Figure 3-6-1 shows the procedural flow for issuing specifications.

If a change occurs in the specifications for a product to be delivered, the procedure outlined in Section 2.5 is followed after advance approval has been obtained from the customer. In this manner, The Company strives to avoid problems with quality with the customer and to improve customer service.

Because the quality contract is contingent upon the “Basic Contract,” the contract is concluded as a “Quality Agreement” in accordance with customer requirements. This agreement clearly defines the obligations and scope of responsibility for both the customer and The Company.
7. ISO/IATF Certification Information

To satisfy the demand for quality of products from customers, we maintain a quality management system based on ISO 9001, which is an international standard, and we also carry out activities toward compliance with IATF16949.

Table 3-7-1 ISO 9001 Certification Status

<table>
<thead>
<tr>
<th>Name of Certified Body</th>
<th>Certification Agency</th>
<th>Certification registration number</th>
</tr>
</thead>
<tbody>
<tr>
<td>KIOXIA Corporation</td>
<td>JQA</td>
<td>JQA-QMA14628</td>
</tr>
</tbody>
</table>
Chapter 4 Environmental Activities

1. Environmental Quality of Products
2. Environmental Considerations for Design, Development, and Process Changes
3. Green Procurement
4. Verification Systems
5. Product Environmental Information Database Creation
Chapter 4 Environmental Activities

1. Environmental Quality of Products

Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment (RoHS) Directive, the End of life Vehicles (ELV) Directive and other regulations in EU restrict the use of environmentally hazardous substances.

Similarly, China, Taiwan, Thailand, several states in the USA and others are introducing their own regulations to manage such hazardous substances.

EU REACH controls highly concerned chemical substances which may cause cancers, contain reproductive toxicity. RoHS directive aims at protecting human beings and environment from hazardous chemical substances contained in the Electrical and Electronic Equipment (EEE) while REACH does the similar things for non-EEE as well.

For semiconductors which comprise EEE, it is now an important quality requirement that we control the level of such substances and replace with non hazardous substitutes as necessary.

Our group companies strive to take the environment into consideration in its business activities such as development, manufacturing, sales, services, and disposal from life cycle perspective, and aims to contribute to society by supplying products that consider environmental impact, and by realizing energy saving and reduction of resource usage in equipment in which NAND flash memory and SSDs are installed.

Our quality focus is not only on the product functionality and reliability but also on the environmental areas for which we are managing the level of restricted substances contained in our products.

Product environmental quality lies across the fields of Quality, Procurement and Environment as shown in Figure 4-1-1. Related section members are working together to achieve our goal.
Chapter 4 Environmental Activities

2. Environmental Considerations for Design, Development and Process Changes

In development and design phases of the products, we conduct environmental assessment to achieve our environmental objectives. We do the same when we change the production process, lines and materials.

3. Green Procurement

To ensure compliance with environmental legislation such as the EU / RoHS directive and the REACH Regulation, the company has created its own list of materials, considering the customer trends. The company also has the green procurement guideline to obtain cooperation from each of its suppliers for the control of environmentally hazardous substances.

The guideline defines the voluntarily controlled substances and their controlled level, and the requirements for the environmental quality management system, including the banned and reportable substances. The guidelines also oblige suppliers to submit the evidences and so on that satisfy the the company requirements. For green procurement, the company endeavors to select environmentally-friendly parts and materials in a joint effort with its suppliers.

4. Verification Systems

We are conducting regular testing of the products for the EU RoHS substances.

For the purchased parts and materials using simple analysis equipment, we regularly conducts acceptance inspections as necessary.

We keep monitoring the parts and materials to avoid contamination from happening in our production process.
5. Product Environmental Information Databases

We are managing environmental assessment data, green procurement reports, product environmental data such as material composition data, etc. by building up materials database for environmental information.

We request suppliers to vigorously engage in environmental preservation. Our group companies prioritize suppliers who perform such proactive activities in our procurement.

Additionally we ask all suppliers to create a system for managing environmental quality (reducing the environmental impact of chemical substances contained in supplied items), and strongly recommend suppliers to obtain ISO9001 and ISO14001 accreditations.

This data base contributes not only to manage restricted substances in our production but also to submit necessary environmental data to our customers in a timely manner.
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