Higher Productivity

Medium-term Goals

Continually Improve Operational Efficiency

Tokyo Electron is striving to promote the standardization and automation of operations and improve productivity along the entire value chain, such as through the development of an enterprise resource planning system and the integration of business systems in each division and unification of databases. In addition, recognizing the importance of quality management, we are striving to further improve business efficiency by implementing quality focus operations.
We are enhancing the awareness and capabilities of each employee regarding productivity by rolling out various educational programs. In addition, we are implementing continuous quality improvement activities throughout the entire supply chain in collaboration with suppliers. We will strive to enhance corporate value, constantly pursuing improved productivity.

Main activities

Promotion of improved productivity

Continuous improvement of business operations, Initiatives for higher productivity, Software development initiatives

Productivity improvement in the value chain

Approach to quality, Management system, Ensuring self-process assurance systems and promoting "Shift Left", Measures to prevent quality problems from occurring and recurring, Initiatives with suppliers

SDGs initiatives

- Promote productivity, continuously increase management efficiency, contribute to the development of the industry and society, and contribute to sustainable economic growth
- Promote streamlined business operations and quality management throughout the value chain, ensuring sustainable forms of production and consumption
- Continuously increasing productivity throughout the entire supply chain through partnerships with suppliers

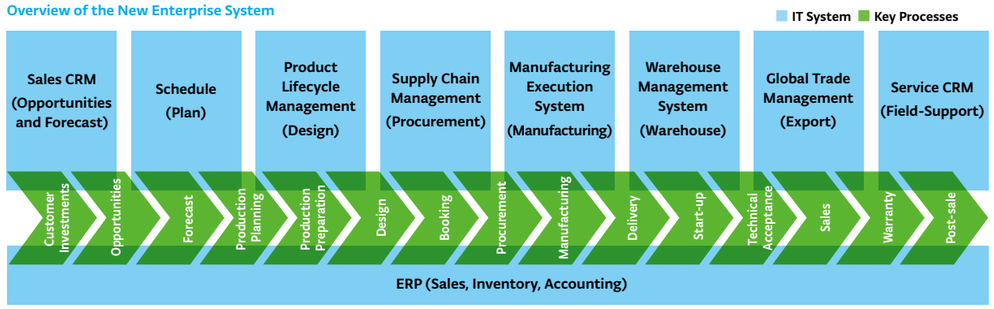
Promotion of Improved Productivity

Continuous Improvement of Business Operations

Tokyo Electron is currently introducing a new enterprise system (ERP[1]) to improve productivity and quality further. The new ERPs, being integrated across operational and national boundaries, is aimed at creating the following five benefits: (1) compliance with the new revenue recognition standards in Japan; (2) business and management decision making with quick response to change; (3) large improvements in business operation efficiency; (4) utilization of globally integrated information with an eye toward overall digital transformation[2]; and (5) realization of ultimate work style reform. Beginning with business operational improvement, we are contributing to the resolution of issues from COVID-19 with global progress in the expansion of telecommuting, the shift to online approval operations, and overall digitalization.

In fiscal year 2021, we made progress in communication and consensus-building that included our headquarters, manufacturing sites in Japan, and overseas subsidiaries, as well as partner companies, to form a globally unified team toward business innovation. In May 2021, the new ERPs began operation, primarily at our headquarters. While making the most of the knowledge gained from this process and the results, we plan to realize a true globally integrated system, with project members and all our employees working as one.

Overview of the New Enterprise System



Initiatives for Higher Productivity

As a manufacturer of semiconductors and flat panel display production equipment, we are committed to continuously improving productivity while remaining focused on safety and quality in operations along the entire value chain.

Specifically, under the slogan "Safety First[3]", we are striving to improve the safety and work environments of every person connected with our business activities, and we are building quality management systems and pursuing quality improvement in the value chain in order to understand the true needs of our customers and to achieve the world's best quality. We are also conducting company-wide activities for compliance with safety and environmental laws and regulations and to make software development more efficient and smarter. In manufacturing operations, our current initiatives include BOM[4] production, module shipment[5] for repeat orders and the building of flow lines[6].

Furthermore, to respond swiftly to customer requests and market fluctuations, we are improving our IT infrastructure and computerizing on-site data by establishing a production system that centralizes all production-related information and introduces a manufacturing execution system (MES[7]). By utilizing the wide range of data aggregated through these systems in each business operation, we can make production schedules more reasonable and more efficient, visualize delivery dates for parts, and achieve stronger coordination between sales planning and production/procurement/inventory planning. In this way, we will comprehensively promote higher productivity in business operations.

In our manufacturing and logistics operations, where we deal with a wide variety of components, we are also working on labor savings and efficiency improvements by establishing automated warehouses, introducing a warehousing navigation system and promoting automated inspections.

1 ERP: Enterprise resource planning. A system that integrates the core business operations of an enterprise, such as accounting, personnel, production, logistics and sales, for better efficiency and centralized information.

2 DX: Refer to p. 19

3 Safety First: Company slogan that prioritizes the safety of every person connected with our business activities

4 BOM: Bill Of Materials. A list of parts that controls a product. It shows the hierarchical structure of the product and includes basic information of each part, including which parts are used to assemble the product.

5 Module Shipment: Equipment is shipped to customers in modules. The modules are assembled into equipment at the customer's site before inspection and adjustment. This helps reduce the lead time between manufacture and shipping.

6 Building of Flow Lines: Building of a system for securing materials and personnel and ensuring that work is carried out accurately and efficiently according to an expected schedule

7 MES: Manufacturing Execution System. A system for understanding and managing production processes and for providing instructions and support to workers.

Software Development Initiatives

Streamlining Product Development and Improving Added Value

Since 1995, we have incorporated platform software developed in-house in our semiconductor production equipment and have worked on streamlining operations and improving product quality. By standardizing platform software, we have been able to reduce the hours spent on developing various types of duplicate functions for each type of equipment, leading to guaranteed real-time[1] control and enhancement of our response to new demands and technologies. Having adopted such concepts as object-oriented[2], we are also working on more efficient development of new platform software for next-generation equipment.

In fiscal year 2021, as a new base for the digital transformation activities we are promoting, we established TEL Digital Design Square, and aim to further improve the added value that our products provide through software development.

Developing Smart Equipment

Amid advances in manufacturing that make the most of innovative technologies such as IoT and AI, our customers are forging ahead in improving productivity by taking advantage of visual representations of data and building smart fabs[3] to improve consistency in quality. Under these circumstances, we will provide advanced equipment operation services and promote "equipment data management" to further enhance the added value of equipment, based on the various types of data generated by customers' equipment.

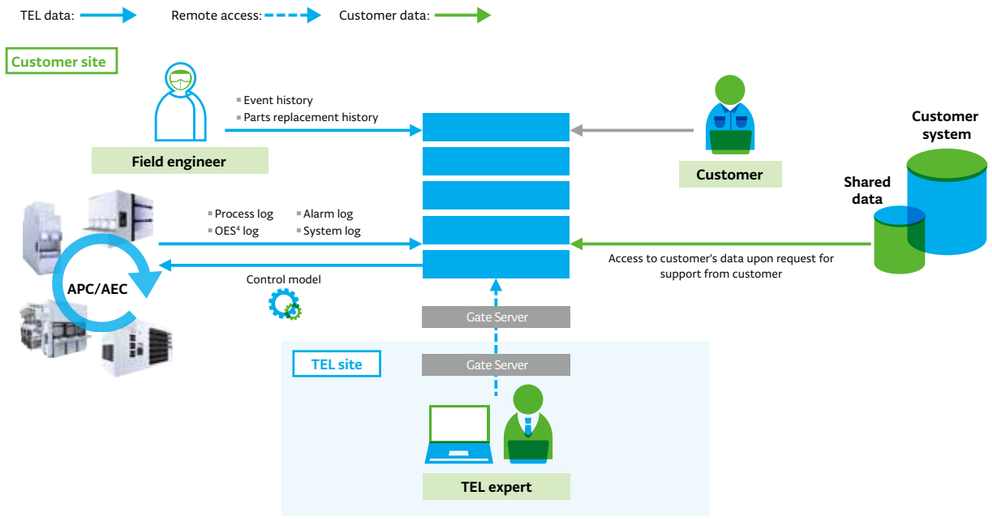
1
Real-time: The property of time limitation until the completion of work

2
Object-oriented: A software engineering theory

3
Smart fab: A fab that utilizes digital data to realize continuous and progressive reform of operational processes and improvements in quality and productivity

4
OES: Optical Emission Spectroscopy

Equipment Data Management Plan



Productivity Improvement in the Value Chain

Approach to Quality

Tokyo Electron has defined its approach to quality as follows:

"The Tokyo Electron Group seeks to provide the highest-quality products and services. This pursuit of quality begins at development and continues through all manufacturing, installation, maintenance, sales and support processes. Our employees must work to deliver quality products, quality services and innovative solutions that enable customer success".

Quality Policy

1. Quality Focus
   Focusing on quality to satisfy customers, meet production schedules and reduce required maintenance even with temporary cost increases.
2. Quality Design and Assurance
   Building quality into products and assuring in-process quality control, from the design and development phase throughout every process.
3. Quality and Trust
   When a quality-related problem occurs, working as a team to perform thorough root cause analyses and resolve problems as quickly as possible.
4. Continual Improvement
   Ensuring customer satisfaction and trust by establishing quality goals and performance indicators and by implementing continual improvement using the PDCA cycle.
5. Stakeholder Communication
   Listening to stakeholder expectations, providing timely product quality information and making adjustments as needed.

We strive to implement own-process assurance systems by carrying out strict risk management and development/design inspections beginning at the development stage and also by ensuring verification of customers' operations using simulations. We have also built an important component traceability system as part of our effort to strengthen our information environment. By making it possible to use the One Platform[1] to view such information as past problems and adjustment values used during manufacturing and assembly, as well as important component inspection information from suppliers, we have successfully strengthened our risk management (FMEA[2]) to prevent various types of non-conformance. We believe that thorough implementation of these own-process assurance systems and prevention makes it possible for employees to focus on high value-added business operations and promote initiatives that lead to Shift Left[3] (front-loading). We will continue to strive to provide high-quality and high-value-added products and services to our customers.

1
One Platform: A platform that makes it possible to easily view multiple different systems as seamless information sources in order to effectively and efficiently achieve traceability.
Refer to p. 28

2
FMEA: Failure mode and effects analysis. Method to identify, prevent and mitigate risks in advance.

3
Shift Left: Refer to p. 17

Management System

To provide consistent, high-quality products, we have built quality assurance systems under the leadership of our Representative Director, President & CEO. We have been promoting ISO 9001 quality management system certification, and all of our manufacturing companies within our group have completed the transition to ISO 9001:2015.

ISO 9001 Certified Plants and Offices

Company Name	Plant/Office Name	Certification Date
Tokyo Electron Technology Solutions	Fujii Office / Hosaka Office	September 1994
	Tohoku Office	December 1994
Tokyo Electron Kyushu	Koshi Office	March 1997
TEL Magnetic Solutions	—	November 2009
Tokyo Electron Korea	Balan Plant	September 2011
Tokyo Electron Miyagi	Taiwa Office	September 2012
TEL Manufacturing and Engineering of America	Chaska Office	March 2013
Tokyo Electron (Kunshan)	—	May 2018

■ Example Initiatives

We are focused on process improvement activities (PCS[1]) using a statistical method. Invariably, our customers' production sites require limited variations in quality between equipment, accurate process repeatability and high productivity. To meet these requirements, we ask our suppliers who handle specific important components to understand the importance of PCS and cooperate with us. Putting the information acquired from various types of important components into control diagrams and carrying out trend analyses together with our suppliers allows us to quickly detect changes in manufacturing processes and take any necessary steps. These supplier activities and the continuous implementation of PCS activities in our manufacturing processes are leading to the suppression of component quality variability and maintenance/improvement of manufacturing processes that produce quality products, ultimately helping us provide products surpassing customer expectations. Since new technologies are being created daily and customer needs are constantly increasing, manufacturing processes that handle new important components need to be constantly reexamined and improved. Our products consist of tens of thousands of components, and the task of selecting important components that are especially relevant to customers' production and tallying and analyzing them regularly requires many hours. To optimize and streamline this task, we reexamine our operational flow, including the adoption of automation, and improve our systems by collecting information from customers, holding discussions among our manufacturing sites in Japan, and interviewing our suppliers. By continuously carrying out these activities that incorporate the concept of Shift Left, we are striving to improve our productivity further.

1 PCS: Process Control System

Ensuring Self-Process Assurance Systems and Promoting "Shift Left"

In order to improve the quality of products, it is important to prevent non-conformance from occurring in upstream processes and to ensure thorough quality control in each process so that nonconforming products are not allowed to flow into later processes. From this perspective, we promote activities focused on self-process assurance systems. In particular, we aim to improve the level of completion of product quality by implementing thorough risk detection and mitigation measures (FMEA) from the initial stages of product design, as well as carrying out thorough inspections in each process and conducting verification using simulation.

Improving the precision of each process and reducing reworking costs in these activities for self-process assurance systems have enabled us to create high-value-added technologies and products in the upstream processes, leading to the promotion of the Shift Left concept. We are also promoting Product Lifecycle Management (PLM) by using self-process assurance systems to comprehensively manage and analyze all processes from product planning, development, design and production through to service, in an effort to facilitate the earlier release of products, enhance operational efficiency, improve quality and reduce costs.

Measures to Prevent Quality Problems from Occurring and Recurring

To comply with ISO and EN[2] safety standards and achieve higher safety levels, we have established our own design rules for each of our products. As an equipment manufacturer, we have developed systems for manufacturing products, which include safety considerations. We have other systems in place for responding to equipment design and production non-conformance and any occupational accidents.

In the event of an accident, we use our TIRS[3] accident reporting system to distribute information to safety and quality personnel in each division, officers and management, including senior management. An accident investigation is also conducted immediately to identify the cause and plan preventive measures.

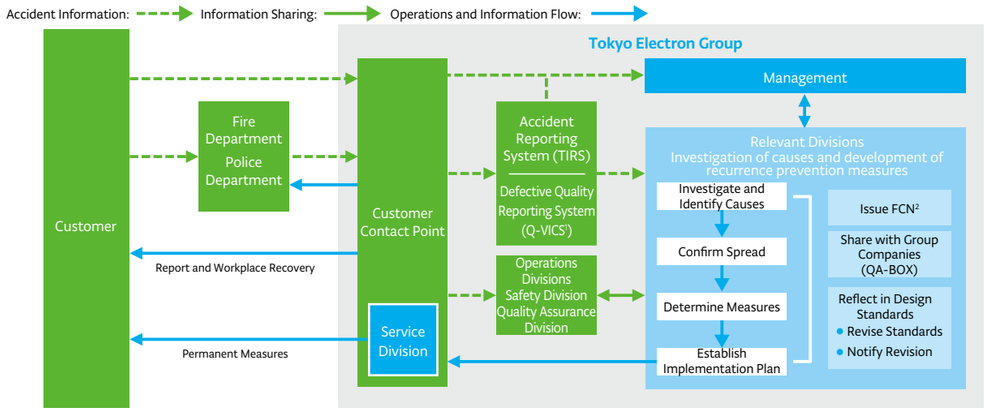
We use a proprietary system called QA-BOX[4] to share information on equipment quality and any major non-conformance across all quality departments in accordance with our operating rules. Measures obtained from the results of an accident investigation are promptly applied, not only to the problem equipment but also to relevant equipment operated by other customers, and revisions are also made to the current design standards. Additionally, we work to prevent a recurrence of the accident by analyzing the factors that led to the human error and creating procedures that are easier to understand.

In operating "QA-BOX", we validate the commonalities among accidents and share the issues and countermeasures in regularly scheduled meetings attended by the Quality General Manager (GMs) responsible for various types of equipment. This allows us to examine various approaches to prevent similar non-conformances from occurring in any of our equipment. Furthermore, by managing the progress of the cases shared in QA-BOX and validating the effects of the measures, we ensure the implementation of effective measures and reduce the number of equipment-caused accidents.

2 EN: European Norm. Uniform standard for the European Union complimenting parts of technical standards not stated in European Commission directives ("New Approach" directives).

3 TIRS: TEL Incident Report System

4 QA-BOX: Tool for the sharing and horizontal expansion of important quality-related information within our company



1 Q-VICS: Quality Valuable Information Chain System

2 FCN: Field change notice. Refers to the general recall notice.

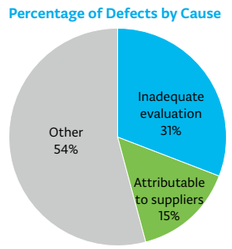
Initiatives with Suppliers

Continuously improving quality based on strong partnerships with suppliers is essential for providing high-quality products quickly to the market. Since fiscal year 2001, we have conducted our unique Supplier Total Quality Assessments (STQA) in an effort to ensure our suppliers properly understand the level of quality expected from them. Before starting a new business with suppliers, an STQA is conducted via self-assessment to evaluate their product quality, costs and information security. The assessment also includes their CSR initiatives, including human rights, ethics, safety and the environment. If a risk is identified, we visit the supplier and confirm the area of non-conformance on-site. Once our approach to quality has been shared with the supplier, we request that they plan and implement improvement measures, and we provide continuous support until all of them have been completed. In addition, we also conduct audits once every three years for suppliers who handle important components and for suppliers where quality issues have been found. Also, in the course of holding regular meetings with the leaders of various manufacturing sites in Japan who use STQA, a system shared by our whole Group, we share supplier-related information and discuss measures to resolve issues.

Additionally, Tokyo Electron Kyushu is working with its suppliers on its own improvement activities. For suppliers judged to require focused evaluation, we add technically focused check items to STQA, based on past case examples of non-conformance, and carry out assessment to prevent recurrence. By continuing these activities, we technically strengthen preventive measures and increase their effectiveness, linking them to further quality improvement.

■ Example Initiatives

Having identified reduction of costs for dealing with defective components and unit parts at customer sites as a material issue, since March 2020, the quality assurance division at Tokyo Electron Technology Solutions have been promoting quality improvement activities focused on a single point. As part of these activities, we categorized defects at all business units (BUs) by cause, and found that 31% were due to inadequate internal evaluation and 15% were related to our suppliers. There was also a tendency for defects attributable to inadequate internal evaluation to be higher for equipment using new technology and for large equipment such as flat panel display (FPDs), and defects related to our suppliers to be higher for other equipment.



3 DSP: Dry Surface Preparation

Based on analysis of the present situation, each BU raises quality improvements that warrant a concerted effort, and proceeds with measures while considering what quality should be like. For example, at DSP[3] Dept. (ES BU) and FPD BU, technical and quality assurance divisions cooperate with suppliers from the planning stage for new equipment, and by using FMEA to extract specific evaluation details, conduct evaluations that take into account the environment in which the customer will use the equipment. TFF BU and TS BU, meanwhile, have been conducting activities aimed at achieving zero defects for components and unit parts with a high frequency of defects, and we are gradually seeing the results of these activities. ES BU and CT BU are also conducting their own quality improvement activities using the "single point of focus" approach in an effort to resolve important matters.

Together with our suppliers, we will continue striving to further improve the quality of our components and unit parts by continuously rolling out initiatives, including the "single point of focus" approach.