

Chapter
3

Quality Assurance

Creating Quality to Earn the Confidence of Society

Industrial products that support today's affluent lifestyles must perform their prescribed functions safely and reliably. As the advance of technology and globalization continues to accelerate, companies are expected to contribute to the growth of the broader society by providing high-quality products and advanced technologies that meet the specific needs of consumers across a range of countries and regions. With a constant focus on the customer's point of view, and an eye on trends in society, NSK will seek to deliver this contribution by practicing "quality-first manufacturing," which is the foundation of safety and reliability.

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Creating Quality to Earn the Confidence of Society

NSK's Approach

The NSK Group aims to become “No. 1 in Total Quality.” In other words, the Group is working to achieve the industry's best quality in everything it delivers—not only products and services, but also information. The Group believes that this commitment to quality ensures that its products will satisfy customers all over the world.

Quality Assurance Vision 2026

NSK put in place the Quality Assurance Vision 2026 as a part of efforts to identify specific targets through 2026. As indicated at the right of the page, this vision also clarifies the ideal state to which the Company aspires. Guided by this vision, NSK will work diligently to achieve a level of “NSK Quality” that engenders trust and contributes to the safety and peace of mind of customers. In specific terms, the Company will endeavor to enhance the quality of its products, work and human resources, key elements that provide the underlying strength of its business activities, while at the same time incorporating the necessary quality to deliver attractive products that reflect the requirements of customers.

NSK Quality

Contribute to Customer Safety, Security, and Confidence

The Ideal State to which the Company Aspires

- Contribute to society by delivering total quality
- Maintain an approach to quality that customers will evaluate highly
- Ensure all employees think and act based on the quality-first principle according to high-quality ethics

Action Guidelines

- Put the customer first
- Be honest
- Provide 100% good products and services

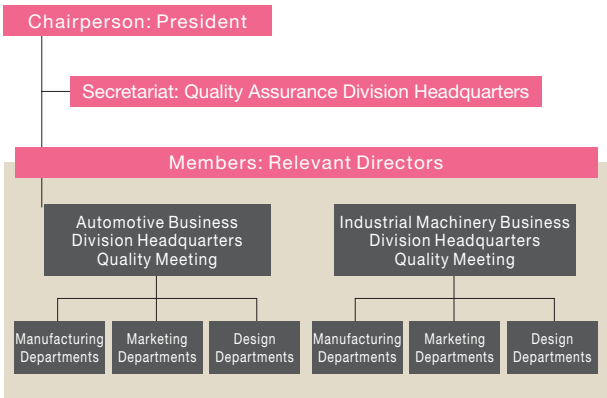
Management

Quality Assurance Organization

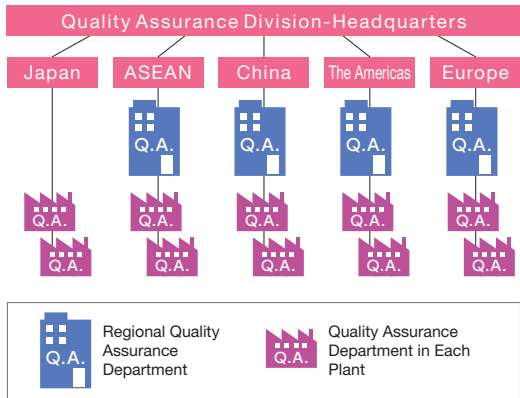
To strengthen Group-wide initiatives, NSK Group management checks the status of quality control and directs the needed initiatives in a top-down manner at the Quality Board Meeting, which is chaired by the president and composed of directors in charge of each business division headquarters. NSK has also established quality committees in each business division headquarters and is working to strengthen quality improvement efforts through cooperation among the manufacturing, sales, and design departments.

Moreover, the Group has established quality assurance departments in Europe, the Americas, China, and ASEAN as well as in other areas. This has reinforced the Group's global quality assurance organization by providing support tailored to the needs of customers in each country and region. Regular annual global meetings and biannual regional meetings are held in an effort to strengthen monitoring, audits, and the support structure in each region while sharing information globally. In the event of a problem with a product or service, information can be provided quickly to customers. The relevant departments are brought together, and they take swift and appropriate countermeasures to prevent the problem from spreading. The causes are promptly investigated and measures are taken to prevent reoccurrence.

Quality Board Meeting



Global Quality Assurance Organization



Quality Management Systems

The NSK Group is obtaining ISO 9001 and ISO/TS 16949* certifications for quality management systems and produces high-quality products that meet customer demands at business sites conducting development, design, and manufacturing (see pp. 38, 82-83 for details). Additionally, the effectiveness of the quality management systems is verified through regularly conducted third-party audits and internal audits. When problems are discovered, appropriate corrective actions are taken, and the level of quality initiatives is continuously improved.

* ISO/TS 16949 is aligned with ISO 9001, the criteria for quality management systems set by the ISO (International Organization for Standardization), with the addition of quality system requirements for automotive-related products.

Mid-Term Targets:

Safety, Security, and Reliability in Terms of Market Quality and the Customer's Appraisal of Quality

NSK is committed to enabling employees to work with enthusiasm while staying abreast of social trends, to making products that customers enjoy using, and to ensuring that the Company grows sustainably. While continually reinforcing its global quality assurance system, the NSK Group will carry out the initiatives shown below, in accordance with its mid-term plan.

The Fifth Mid-Term Management Plan (FY2016 to FY2018)

1. Fostering quality-first culture and human development
2. Enhancing preventive measures for quality monitoring and audit
3. Establishing a field quality*¹ responsibility system
4. Reasserting strict adherence to quality control basic matters
5. Enhancing site control ability based on the 5 GEN-Principle*²

*¹ Field quality refers to the quality products display during actual use by end users.

*² A set of Japanese principles that focus on "GEN-ba," the ACTUAL frontline; "GEN-butsu," the ACTUAL item or product; "GEN-jitsu," the ACTUAL condition or situation; "GEN-ri," the ACTUAL principle or theory; and "GEN-soku," the ACTUAL rules or standards.

Overview of Activities and Main Initiatives in FY2015

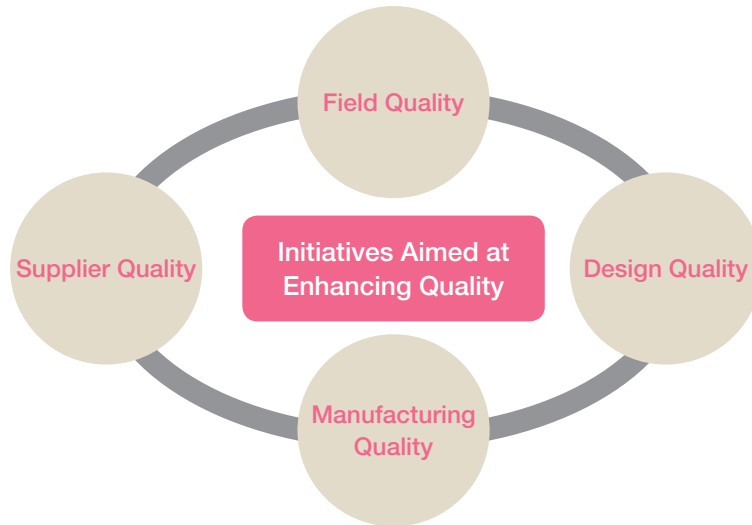
In fiscal 2015, the NSK Group conducted activities based on the Three Pillars of NSK Quality Assurance (shown below). The Group is working toward "establishment of corporate fundamentals appropriate for a company with net sales of 1 trillion," which is a goal set out in the Fourth Mid-Term Management Plan, and increasing the level of its quality management is a key part of this effort.

Three Pillars of NSK Quality Assurance

1. **NSK Product Development System (NPDS)**
In order to quickly transform new orders into reliable, stable production, the NSK Group is promoting initiatives that build quality into each process.
2. **NSK Quality No. 1 (NQ1) Program**
The NSK Group is promoting initiatives to realize stable production and ensure zero defects.
3. **Human Resources Development**
The Group is promoting human resources development in order to build a stronger foundation for quality creation.

Initiatives to Achieve Higher Quality

The NSK Group recognizes that quality can be classified into the field, design, manufacturing and supplier components. On this basis, the Group makes every effort to enhance quality in order to garner the high acclaim of customers.



● Initiatives Aimed at Enhancing Field Quality

As a company that services the manufacturing sector, the NSK Group works diligently to achieve a level of quality that meets the expectations of the market and end users. Looking beyond the level of quality that satisfies its direct customers in the manufacturing industry, the Group strives to accurately grasp the needs of end users while putting in place a structure that is capable of advancing manufacturing proposals.

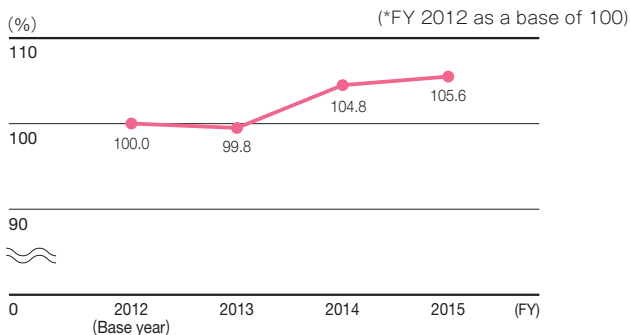
▣ Gathering and Analyzing Information on Market Trends and Feedback Initiatives

To accurately understand market trends, the NSK Group gathers and analyzes information, such as that on quality defects, in an effort to monitor field quality. This information is managed and fed back to all relevant departments, including development and design, manufacturing, and sales. This effort increases customer satisfaction by leading to a higher level of product and service quality, preventing quality problems, and facilitating rapid responses if any defect does happen to occur.

▣ Customer Satisfaction Survey

The NSK Group has been conducting a periodic customer satisfaction survey since fiscal 2012, with the aim of increasing customer satisfaction with NSK's products and services, as an indicator for managing field quality. Relevant departments, such as sales, engineering, and manufacturing, strengthen their initiatives based on the survey results.

● Degree of Customer Satisfaction



Highlight Commendations of Quality from Customers

The NSK Group has received letters of appreciation and commendations from customers, including manufacturers, in recognition of its efforts over many years to increase quality.

- Jul. 2015: "Award for Excellence in Quality" from Aichi Machine Industry Co., Ltd.
- Sep. 2015: "Zero Award" for level of quality provided to the Honsha Plant of Toyota Motor Corporation

● **Establishment and Use of a Customer Management Database**

The NSK Group provides technical support related to design and expertise in the use of products, in order to accurately meet customer requests. The Group has also established a database for accumulating information such as records of how customer requests were met. The database is used to improve products and services by bringing together information from around the world.

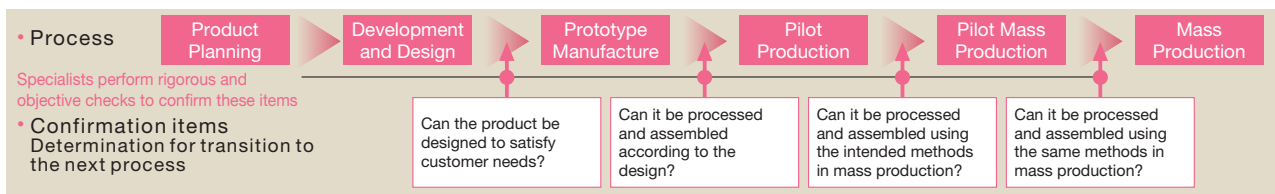
● **Initiatives Aimed at Enhancing Design Quality**

The NSK Group is endeavoring to enhance the quality of its design capabilities by incorporating feedback from customers in the marketplace. The Group makes every effort to design products with a superior level of quality by meeting its own unique level of quality targets over and above the basic quality that customers have come to expect.

■ **NPDS: Building Quality into Each Process**

The NSK Group has deployed its unique NSK Product Development System (NPDS) globally. The system is used for new projects and is designed to achieve efficient mass production of high-quality products by solving problems at key points in each process before moving on to the next stage. In fiscal 2015, the Group fully rolled out its Quick DRs—efficient design reviews focused on the parts of the design that have been revised—making them a part of daily practice.

● **Outline of the NPDS**



■ **Training of Reviewers**

To improve design quality, NSK has established its own qualifications and is training experts around the world to perform design reviews (DR). These experts, who are divided into ranks such as DR Pilot and DR Crew depending on their proficiency level, identify issues related to product quality from the design phase, which leads to prevention of problems down the road.

● **Initiatives Aimed at Enhancing Manufacturing Quality**

The NSK Group works diligently to deliver a consistently high level of product quality that meets customers' requirements.

In addition to building manufacturing processes that focus on the 4Ms (manpower, machinery, materials and methods), the Group is looking to enhance the quality of its products.

▣ NQ1 Program for Stable Production with Zero Defects

As part of its NQ1 program, NSK is engaged in improvement activities aiming for the very best quality, with zero defects, called “*Dantotsu* activities.” Each plant in Japan decides initiative themes and carries out various improvements targeting zero defects on a test line. In fiscal 2015, study sessions bringing personnel from all the plants together have been held regularly to deepen understanding of case studies from other plants and further enhance initiatives. Initiatives that were effective on the test lines are quickly rolled out to other lines to reduce defects efficiently. The accumulated know-how in Japan is also deployed horizontally to the main manufacturing sites around the world, enabling the Group to standardize quality at a high level.



NQ1 program

▣ Self-Audit System for Heat Treatment Processes Rolled Out Worldwide

The NSK Group has created a self-audit system to prevent product defects. With the globalization of production, in fiscal 2015 the Group focused on the worldwide rollout of its self-audit system for heat treatment processes. Under the system, the persons in charge visited production sites and suppliers several times to conduct onsite audits. Only personnel that have achieved a high level of expertise are designated as in-house auditors.



Education on self-audit system for heat treatment processes

Highlight Smart Factory Concept and the “Quality Cockpit”

The NSK Group is taking initiatives aimed at the creation of smart factories that will analyze a variety of information from production processes to prevent the production of defective products and establish a flexible manufacturing system.

As part of those initiatives, the Group is adopting the Quality Cockpit, an effort to improve productivity by preventing the production of defective products instead of responding after they are produced, by analyzing large amounts of data measured during equipment operation and parts processing and visualizing it to monitor signs of trouble.

● Initiatives Aimed at Enhancing Supplier Quality

High-quality materials and parts, as well as other key inputs including various types of oils and greases, are essential in the manufacture of high-quality products. The NSK Group engages in a wide range of activities aimed at enhancing quality based on strong ties of mutual trust with suppliers.

▣ Quality-Focused Procurement

The NSK Group conducts receiving inspections on parts and raw materials delivered to its business sites in each country and region. It also visits suppliers to verify their quality management. When starting business with new suppliers, it not only verifies the quality of procured items but also the systems and actual state of quality management at the design and production stages. By taking all of these steps, the Group ensures that its procurement is focused on quality.

▣ Sharing Issues with Suppliers

The NSK Group provides education on continuous improvement activities while sharing issues and engaging in initiatives to increase quality with suppliers through regularly held technical meetings and quality meetings.

▣ Visiting Suppliers

The NSK Group strives to increase the level of quality while deepening mutual understanding with suppliers by sending personnel from the NSK headquarters, regional headquarters, and plants around the world to visit suppliers and audit their processes and exchange information.

In fiscal 2015, NSK sent a questionnaire to suppliers of parts and raw materials in Japan that would be difficult to substitute from the standpoint of quality assurance, asking them to conduct self-assessments to confirm the progress of initiatives on matters such as response system in the event of an earthquake and envisioned damage and countermeasures (see “Initiatives to Build a Disaster-Resistant Supply Chain” on p. 23 for details). NSK also conducted audits on and provided guidance to suppliers requiring improvement in their level of quality.

Developing Human Resources Critical to Superior Quality

The NSK Group provides a range of education and training programs to develop the human resources needed to ensure manufacturing of superior quality. All divisions work together to create products and services that deliver ever higher levels of quality and customer satisfaction.

● Overview of Quality Education

NSK provides appropriate quality education according to each employee's rank and department.

● Rank-Based and Department-Based Quality Education System

Rank	Plant	Technology Division	Sales Departments	Management Division
Senior Managers/ Managers	Quality Knowledge Education			
Assistant Managers	Quality Management Education	Quick DR (DRBFM) ^{*2}	Sales Quality Education	
Staff Skilled Operators	NSK Manufacturing Education and Training Centers ^{*1} (beginner / intermediate)	NSK Institute of Technology ^{*3} (2nd/3rd years)		
Group Leaders (Plants only)	Quality Education Why Analysis	—	—	—
New Employees	New Employee Education / 7 Tools of QC / FMEA & FTA ^{*4}			

*1 NSK Manufacturing Education and Training Centers: See p. 48 for details.

*2 DRBFM: Design Review Based on Failure Mode. A technique for preventing quality trouble by focusing on design changes to investigate failure mode effects.

*3 NSK Institute of Technology: See p. 47 for details.

*4 Failure Mode and Effects Analysis, and Fault Tree Analysis

● Quality Education in Sales Departments

The NSK Group has been conducting Sales Quality Education since fiscal 2010 with the aim of increasing customer satisfaction by raising the awareness of quality among employees in sales departments, which are the point of contact for customers. Using lectures and e-learning, the Group attempts to instill such knowledge as techniques for practical quality management and problem solving, which can be immediately used in sales activities, in different languages.

In fiscal 2015, the Group provided education in new countries and regions that it could not provide in fiscal 2014. In regions where the education was provided in fiscal 2014, it provided education to new employees and, where necessary, had employees retake the training, under the keyword of “continuity.”



Sales Quality Education

●Quality Month

In order to create products that customers can select with confidence, NSK recognizes that it is essential for every employee to maintain a high level of quality awareness.

The NSK Group holds Quality Month, which promotes awareness of product quality, to realize a range of quality improvements in November every year. During Quality Month, employees are encouraged to submit ideas for an NSK quality slogan that captures their concept of quality, and the best slogans are selected for display on posters at all sites. Priority initiatives are set by each plant according to a Group-wide theme determined by the Quality Assurance Division Headquarters, and employees work hard to further improve quality.



Quality slogan posters