

Providing Products that Contribute to Better Social Environment

Guided by the Corporate Philosophy, which puts customers first, the NGK Group considers the provision of products and services that contribute to a better social environment to be one of its most important missions in an effort to create quality from the customer's perspective.

Basic Approach

The NGK Group engages in the creation of quality from the customer's perspective by defining Quality Objectives each year in accordance with the Quality Policy based on the NGK Group Guidelines for Corporate Behavior.

Initiatives for fiscal 2017

NGK has focused on clarifying changes and creating systems not to miss the impact of the changes on quality because quality problems are likely to occur with the changes. In fiscal 2017, we will strengthen activities to recognize the importance and expand our knowledge of risk elimination to all NGK members.

Quality Policy

NGK is dedicated to quality and committed to providing valuable products and services that are trusted by our customers and respected by society.

Quality Objective 2017

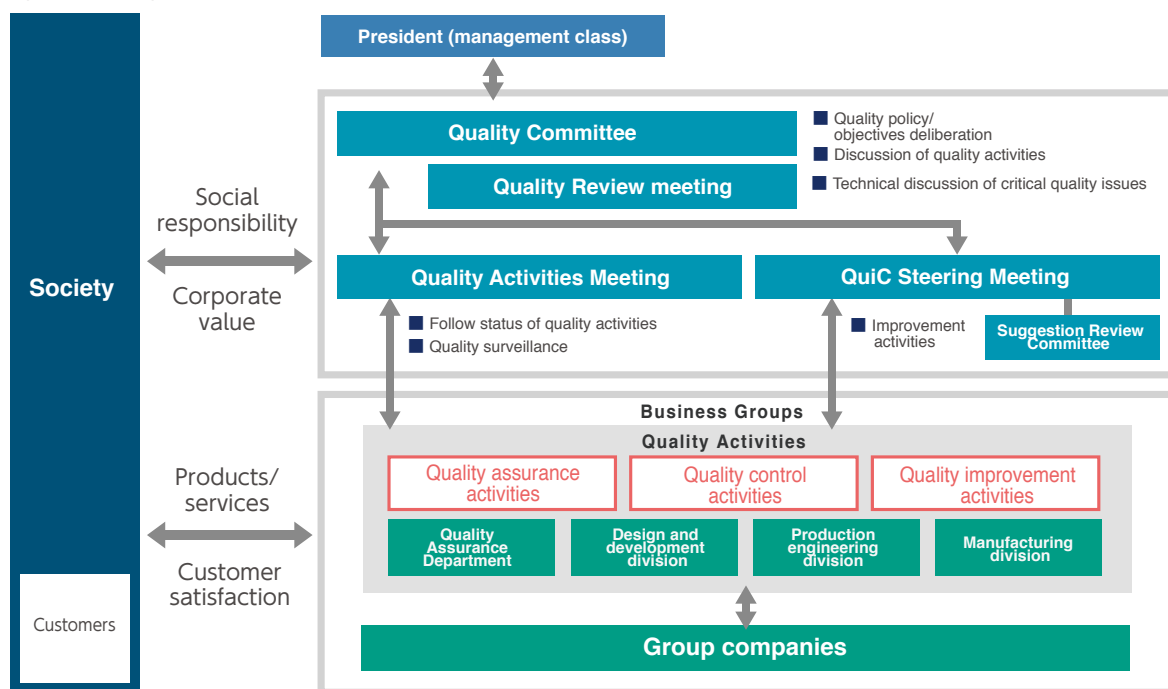
Recognize the importance and expand our knowledge of risk elimination to meet customer's Quality Expectations.

Quality Activity System

The NGK quality activity system consists of a company-wide system, led by the Quality Committee chairman, and business division internal activity system, led by the heads of each business division. In terms of company-wide activities, the Quality Committee was established to function as a deliberative body assisting the Quality Committee chairman, while business division internal activities systems were put in place for each business line, creating appropriate quality systems for each. Quality assurance, quality control, quality improvements and quality education activities are promoted by the acquisition of ISO9001 or TS16949 certification.

In the event of a major customer complaint, the CSR Committee Chairman and the Quality Committee Chairman will discuss and cooperate to take responses. Technical issues are discussed at Quality Review meetings, as necessary, to plan countermeasures, and the Quality Committee Chair supervises execution of the measures at the responsible division. In case of a customer complaint requiring disclosure, the CSR Committee Chairman will direct necessary arrangements to take an appropriate response without delay.

Quality Activities System



Quality Management System Acquisition Status (March 2017)

The NGK Group quality management system has acquired 34 certifications (ISO9001 or TS16949) covering 100% of production bases in Japan and overseas.

NGK Group Quality Activity Rules

The NGK Group promotes restructuring of its quality activities to respond more precisely to increasing and diversifying quality demands from customers in different target markets. In particular, quality activity rules have been formulated to eliminate quality risks in the market; we are promoting the establishment and improved efficacy of the rules.

From the Establishment of Rules to More Effective Operation

In fiscal 2016, each business division vigorously promoted quality activity improvement plans aimed at activities better suited to their operations. In the Power Business Group, procurement, design and manufacturing worked together to minimize customer complaints, and reduced the annual total number of complaints to one-third of the previous year. In fiscal 2017, we will launch the Quality Risk Elimination Process (QRE-P) in addition to the ongoing quality activity rules. QRE-P provides work procedures aimed at simultaneously achieving quality improvement and risk elimination in design processes. QRE-P is also a tool, created based on the findings that NGK acquired from past quality activities and specifically demonstrated risk awareness that had relied on personal experiences and skills. QRE-P will be distributed to the NGK Groups in the next three years.

The NGK Group promotes restructuring of Four rules for quality activities

○ **Quality confirmation rule:**

Establishes milestones, from development to start of production, and confirm conformance with six quality levels when production processes change.

○ **DR function strengthening rule:**

Registers DR plans with quality risks of medium or high level as important DR subjects with participation of DR reviewers. The Quality Management Department head holds company-wide DR for cases with particularly high risk level.

○ **Quality monitoring rule:**

Monitor and share information company-wide with respect to quality status changes or problems concerning products or markets. Manufacturing defects and customer complaints are shared company-wide every month through reports to the Quality Management Department, and the appropriateness of countermeasures is discussed.

○ **Handling major customer complaints rule:**

In the event of a serious customer complaint, including a potential complaint, the situation is promptly reported to the Quality Committee Chair to formulate company-wide countermeasures.

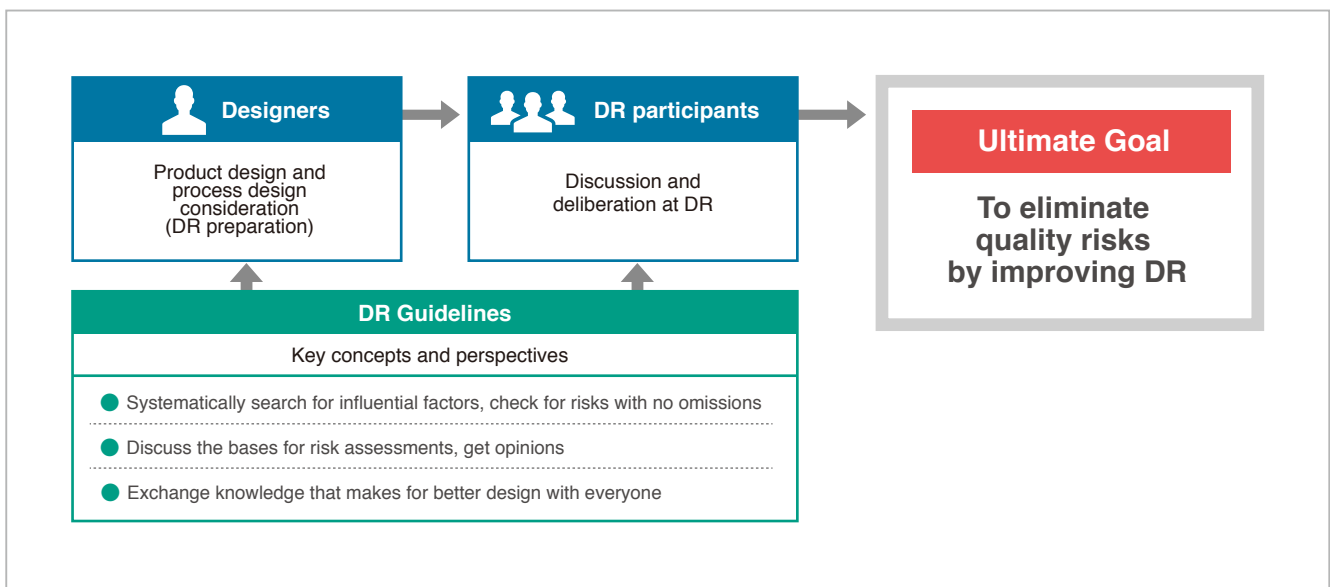
Activities to Enhance DR Functions

The increasing and diversifying quality demands from customers call for the integration of knowledge among various members, not only from the Design division but also from the Manufacturing and Production Engineering divisions, throughout the development process. For this reason, the Group considers the Design Review (DR) to be the most critical activity. DRs are conducted when development milestones are reached or when production processes change. Critical DRs are conducted by reviewers from throughout the company to support the elimination of risks.

The DR Guidelines were created to promote DR discussions and to eliminate quality risks thoroughly. We are constantly enhancing the effectiveness of DRs through efforts to spread this guidelines, including education and reviews of each DR. In addition, we have prepared and are utilizing the DR evaluation indicators to encourage improvements by visualize the progress of each division's level.

Furthermore, NGK organize a company-wide DR (Quality review meeting) for the quality trouble which is difficult to solve by one division, and discuss broad aspects of issues related to the reliability and safety of products by relevant engineers and experts across the company.

In fiscal 2016, the third year since the introduction of DR evaluation indicators, a special meeting was held for heads of NGK's eight DR-hosting business divisions to exchange opinions on DR activities. Participants discussed the divisional situation regarding utilization of the indicators and related issues, and agreed on the view that measures should be taken to raise awareness of the role of DR in identifying risks. Going forward, we will place greater focus on developing solutions to identified risks, with the intention of strengthening DR functions.



Quality Activities at Overseas Production Bases

From their inception, overseas production bases have created quality systems appropriate to their situations and acquired ISO9001 or TS16949 certification. Monthly reports from each base regarding customer complaints and the status of manufacturing quality are discussed at quality activity meetings, enabling the entire NGK Group to evaluate the quality status in a timely manner. Moreover, quality activity rules and annual quality objectives are developed in an attempt to develop and enhance quality activities.

The NGK Group's Quality Activities Meeting Held at Overseas Plants

In fiscal 2016, the meeting was held at five plants overseas. Discussions were held on the important subject of each plant to improve quality. Information was also provided on the situation of the NGK Group's quality activities.

The meeting was held at:

- NGK Stanger Pty Ltd
- Siam NGK Technocera Co., Ltd.
- NGK Ceramics Polska Sp. z o.o.
- NGK Ceramics Europe S.A.
- NGK Electronics Devices (M) Sdn. Bhd.



Quality activity meeting held at Siam NGK Technocera

TOPIC

Quality Improvement Activities at NGK Ceramics Suzhou Co., Ltd. (China)

NGK Ceramics Suzhou honors excellent employees every month for each process. The excellent people are selected by the total number of points that added the contribution to quality and other improvement and the reduction points such as quality defects. This activity is helping to improve quality and motivation of employee.



QuiC Activities to Improve Quality with Full Employee Participation

Since 2003, the NGK Group develops QuiC (Quality up innovation Challenge) quality improvement activities in which all employees participate. These activities consist of quality improvement activities by small groups and suggestions that strive to enhance the quality of products and work; the best practices are shared by the entire NGK Group. Every July, NGK holds a company-wide contest at its headquarters to highlight examples of outstanding improvement activities with the intent of horizontal expansion throughout the company.

In fiscal 2016, 12 best manufacturing practices, including five cases from overseas plants, and 4 non-manufacturing practices including one overseas sales office, were introduced. The presentation attracted some 400 audiences including President and directors.

Fiscal 2016 Suggestion Activity Participation Rate	
Manufacturing divisions	100%
Non-manufacturing divisions	93%
Number of Suggestions	Approx. 39,000



In the manufacturing practices, NGK Ceramics Polska won the Grand Prize for two years in a row for the innovative project that achieved outstanding results.



In the non-manufacturing practices, the President's Special Award was newly introduced, eliciting an eager response from participants.

Offering Award Recipients an Opportunity to Visit Overseas Sites

From the end of October to the beginning of November 2016, four representatives (from Japan) commended for improvement suggestions in fiscal 2015 and two representatives from the 2016 Grand Prize winning team (from Poland) visited NGK-Locke Polymer Insulators and NGK Ceramics USA (both in the U.S.). At the two companies, the visitors and the local employees took training to be aware of risks for improvement and exchanged opinions.

This program is organized to provide participants with a firsthand opportunity to observe plants in other countries and talk with local and expatriate employees, thereby helping them better understand the importance of the mother factory as well as encouraging self-development. It is also expected to inspire workers at host companies to increase their quality awareness and motivation for engaging in improvement activities, thus accelerating the overall efforts of the Group.

In December 2016, another six individuals (from Japan) commended in fiscal 2015 and seven representatives (including one from China) from the 2016 prize winners visited Okinawa to attend a nationwide QC Circle Conference and participate in discussion sessions.



Visitors giving guidance at NGK-Locke Polymer Insulators

Expanding Improvement Activities to Overseas Production Bases

The NGK Group is working to expand improvement activities to overseas production bases. In fiscal 2016, our representative attended the QC contest of NGK Ceramics Suzhou in China in September. Also, they introduced NGK's QuiC activities as well as conducted an activity level survey for improvement activities in the Chinese production Base.

Strengthening Quality Education

Traditionally, quality education at the NGK Group has focused on manufacturing site improvement methods such as the QC approach and QC tools.

In recent years, we face increasingly sophisticated and diversifying customer requirements for quality in many different markets. To meet such quality needs required for each product line and business division, we offer more practical programs where issues that are most relevant to participants are addressed.

Main practical programs Strengthened in Fiscal 2016

Program name	Number of days and participants	Objective
Quality Basic II	63 days; 40 (all technical personal in the third year of joining the company)	Lean and practice problem-solving using quality engineering methods
Preventive action training	Lectures and workshops to examine issues by product line: 6 days; 40 in total	Understand basic approaches to preventive action and recurrence of quality incidents and risk examination procedures
	Sessions to examine risks involving development projects: 8 days; 20 in total	Experience the risk identification and countermeasure planning using a development project.
Method of creation and Learning from Failure	4 days; 70 in total	Improve analysis and development skills to learn from failure and apply for the future

For the Method of creation and Learning from Failure program, an expert was invited to correct and give advice on the work of participants to improve their analytical skills to adequately functional levels. In the class, the expert presented correction results and advice on each performance to be shared among participants, focusing on descriptive and analytical accuracy and occasionally in a very critical manner. The program was well received by many participants, who particularly appreciated practical training styles that helped them better understand methods for analyzing failures. We plan to enhance this training program and make analysis models internally accessible, with a view to forging a positive mindset toward learning from failure to improve our ability to prevent risks.

48 employees passed the Self-Maintenance Expert Test

Fifty-one employees in manufacturing divisions and engineering centers who are engaged in NGK's voluntary maintenance activities passed the Self-Maintenance Expert Test (Japan Institute of Plant Maintenance) conducted in October 2016. This qualification is given to those who possess a broad range of knowledge and skills necessary concerning quality management, safety, and machinery maintenance and are certified to have ability of planning and implementing voluntary maintenance activities and giving instruction. NGK will continue to encourage employees to acquire such qualifications in order to improve quality management capabilities at manufacturing sites.

Strengthening Quality Education at Overseas Production Bases

We work to strengthen quality education at overseas production bases. In fiscal 2016, quality improvement training was offered at NGK-Locke Polymer Insulators and NGK Ceramics USA in the U.S.