

Risk Management

In line with business expansion, the NGK Group is also engaged in minimizing risks related to globalization and diversification while augmenting our risk management structure. The CSR Committee periodically confirms and follows up on the status of Group-wide risk countermeasures to ensure every effort is being made to manage business risks.

Basic Approach

The NGK Group Guidelines for Corporate Behavior were announced within and outside the company as our basic stance toward the realization of the NGK Group corporate philosophy of creating new value by providing products and technologies that contribute to a better social environment. This includes initiatives that strictly observe the protection of third-party rights and corporate assets and trust through the practice of risk management.

Reference
URL

Corporate Philosophy and Guidelines
for Corporate Behavior

<https://www.ngk-insulators.com/en/info/governance/index.html>

Risk Analysis and Response

There are six types of risk which are viewed as common to all companies within the NGK Group, including compliance, information, and employment/labor. We make an effort to avoid and prevent these risks through deliberation of budgets and plans and overall examination and analysis in the course of execution and settlement processes at Strategy Committee and Executive Committee meetings.

Business continuity planning (BCP) was formulated to ensure the continuation of critical business functions in the event of large-scale natural disasters including wind and flood damage and earthquakes, massive transportation accidents or other emergency situations, which will be addressed by the Central Disaster Prevention and Control Headquarters and BCP Countermeasures Headquarters.

Company-Wide Shared Risks

Category	Risk
1. Compliance	Legal/regulatory infractions, improper accounting
	Misappropriation by individuals
	Bribery
	Violation of intellectual property rights
	Human rights violations, harassment
	Trouble with local communities
	Response to antisocial forces
2. Information	Information systems breakdown
	Leak of proprietary or personal information
	Inappropriate use of social media

Category	Risk
3. Employment/Labor	Labor troubles
	Labor accidents
	Traffic accidents
	Long working hours, health management
	Support for unskilled labor
	Labor issues at suppliers and subcontractors
4. Incidents/Accidents/Disasters	Incidents and accidents
	Natural disasters
5. Environment	Environmental management trouble
	EMS insufficiency
6. Product Safety	Defective products

Business Risks

We have identified the following risks which have the potential to impact the operating results, share price, financial position, etc., of the NGK Group.

Production Bases

The NGK Group's main production bases are located in Aichi Prefecture and Ishikawa Prefecture in Japan, and overseas in the Americas, Europe, Asia, and other regions. The Group operates a global production system for its core products, such as ceramic honeycomb substrates for automotive catalytic converters, from the perspective of manufacturing close to demand centers and achieving optimal production. This ensures that risk is dispersed among manufacturing sites. However, irrespective of whether a production base is in Japan or overseas, if facilities at a major production base are seriously damaged by a natural disaster such as an earthquake or fire, production may stop for a considerable period of time, thereby adversely affecting the NGK Group's business performance and financial condition. Overseas operations, in particular, carry such potential risks as i) compliance with the host country's laws, regulations or taxes, ii) adverse changes in the economic environment such as fluctuations in exchange rates, iii) difficulty in securing, educating and training personnel, iv) inadequate infrastructure, and v) societal problems such as terrorism and war.

The unforeseen occurrence of any of these events could adversely impact the NGK Group's business performance and financial condition.

Exchange Rates, Interest Rates, and Material Prices

The NGK Group produces and sells products worldwide. Consequently, the Group hedges the risk of short-term changes in the exchange rates of major currencies, particularly the U.S. dollar, euro and yen, with forward foreign exchange contracts and other financial instruments. However, appreciation of the yen could cause a decline in net sales and earnings, which could adversely impact the NGK Group's business performance.

The NGK Group plans to continue making the necessary capital investments to expand its businesses and improve productivity. The Group's funding needs include these capital expenditures and the redemption of corporate bonds. In the event of interest rate rises, future fund procurement costs may increase, which could adversely impact the NGK Group's business performance and financial condition.

Rises in raw materials prices have led to higher manufacturing costs at NGK Group businesses. To minimize this factor, the Group raises sales prices, cuts costs, improves productivity, and reduces business expenses. The NGK Group endeavors to absorb rises in purchasing prices, but excessive rises in the prices for raw materials may adversely impact the Group's business performance and financial condition.

New Products

The NGK Group works to create new products to secure its growth prospects. The Group makes focused investments in new products that should become pillars of growth in the future. At the same time, NGK is making capital expenditures in stages for products for which demand is expected to expand.

However, in the event that these capital expenditures are not made on schedule, this may adversely impact the NGK Group's medium-term growth prospects.

Changes in the Business Environment

Demand for the products that the NGK Group manufactures and sells is strongly influenced by changes in the economic climate in and outside of Japan. Such changes may adversely impact the Group's business performance and financial condition.

Product Quality

Guided by its Corporate Quality Policy, the NGK Group conducts quality-related activities in a committed drive to ensure consistent high quality. These efforts notwithstanding, the Group cannot completely eliminate the possibility of quality-related issues from every product that it sells or manufactures. The occurrence of such problems could therefore have a substantial and adverse impact on the Group's business performance.

International Investigation Related to Competitive Conditions

The NGK Group is currently the subject of an international investigation related to competitive conditions and is giving its full cooperation. The investigation is being conducted by authorities concerned with competition, and depending on the outcome, there may be an adverse impact on the Group's business performance and financial position.

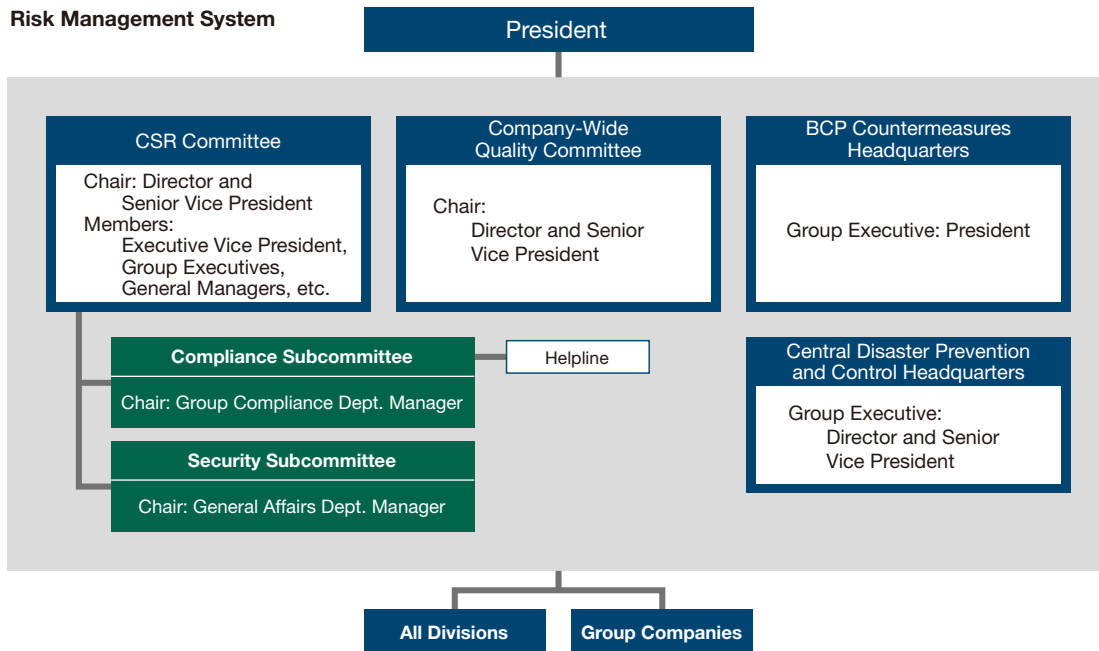
Reference
URL

Plea Agreement with U.S. Department
of Justice concerning ceramic substrates
for catalytic converters

https://www.ngk-insulators.com/en/news/20150904_9235.html

Risk Management System

NGK operates a risk management promotion structure led mainly by the CSR Committee. A person of responsibility and response structure is established for each risk category in an effort to improve risk response capabilities and risk prevention activities.



Risk Response

Normal operations	Follow up by CSR Committee and other committees	
Emergency situation	Legal/ethical or incident/accident response	CSR Committee is in charge. Initial response by eight people chosen ahead of time to handle emergencies + relevant corporate officers
	Quality-related accidents	Company-Wide Quality Committee is in charge
	Disaster-related incidents	Central Disaster Prevention and Control Headquarters and BCP Countermeasures Headquarters are in charge

Identifying and Preventing Risks Based on Questionnaire

As part of an effort to enhance risk management practice, NGK and its domestic Group companies have been conducting the CSA (Control Self-Assessment) questionnaire. In fiscal 2017, the CSA questionnaire and the compliance awareness survey were combined into the CRS (Corporate Risk Survey).* The aim of this survey is to grasp and prevent various potential risks arising from daily business operations, and check the understanding of respondents regarding potential risks and their impact. Based on the results of the survey, risk management measures are planned by the relevant divisions and departments in order to reduce risks.

*Survey conducted in December 2017, targeting 2,008 people. The number of respondents was 1,836 (response rate 91.4%).

Risk Management Measures Based on the CSA Questionnaire

Group-wide risk response measures formulated by risk response departments and divisions*

Category	Measures scheduled for 1st half FY2018
Group/General	Ongoing monitoring on understanding of responses to incidents specified in the internal Basic Rules of Crisis Management
Compliance	<ul style="list-style-type: none"> • Ongoing compliance training for competition laws, anti-bribery regulations, intellectual property policies, etc. • Quality-related compliance training • Preparations for contract compliance-related training
Information	<ul style="list-style-type: none"> • Review and registration of Document Control Managers, etc. • Review content for implementation of information leakage-related training • Ongoing introduction at Group companies of targeted attack prevention system
Employment/Labor	<ul style="list-style-type: none"> • Ensure employees receive two "refreshment days" a week • Work time management; follow up on health support for long-hour workers • Establish targets for overtime work reduction
Incidents/Accidents/Disasters	<ul style="list-style-type: none"> • Communications drills anticipating overseas emergencies • Ongoing implementation of machine keeper training and predictive maintenance tool operations assessment • Health and safety audit of Japanese and overseas Group companies • On-site reviews/audits of environmental management status at Japanese and overseas Group companies
Product Safety	<ul style="list-style-type: none"> • Establish business quality improvement targets and provide support for business division quality-related risk elimination • Update and promote awareness of quality compliance-related rules • Regular audits of important component suppliers

*Human Resources Dept., Legal Dept., Intellectual Property Dept., Group Compliance Dept., General Affairs Dept., Purchasing Dept., Information Technology Dept., Corporate Planning Office, Environmental Management Dept., Quality Management Dept., Safety & Industrial Health Management Dept., Manufacturing Engineering Dept., Construction & Maintenance Dept., Global Engineering Center

Legal Risk Management at Overseas Group Companies

The NGK Group is engaged in strengthening its ascertainment of legal risk management status in overseas business to minimize the globalizing and diversifying risks associated with business expansion.

We ask all overseas group companies to report information pertaining to the status of lawsuits, legal affairs and consultation with lawyers twice a year, and helpline usage, export controls and access to legal-related information once a year. Major issues found in such reports are reported to the Compliance Subcommittee and CSR Committee to share information.

Consultations from overseas locations are handled by lawyers and legal departments to avoid risks.

Business Continuity Planning (BCP) Initiatives

The NGK Group is developing company-wide business continuity planning (BCP) through the establishment of the BCP Headquarters, an organization for leading business continuity and quick recovery in the event of a large-scale natural disaster, led by the President. Countermeasure initiatives include the establishment of multiple manufacturing bases and procurement sources, damage mitigation measures related to buildings and equipment, and employee safety assurance.

We conduct emergency drills assuming a natural disaster as a field exercise of the BCP. In the drill, participants are instructed to take real actions faithfully according to the plan, through which we identify in detail issues related to each process and procedure and use the findings to improve the BCP.

Fiscal 2017 Initiatives

- Real-time simulation training was implemented for business group members, individual committees, and among committees of the Nagoya, Chita, and Komaki sites
- Earthquake-induced liquefaction and typhoon storm surges were added to damage estimation, and risk responses were enhanced

Future Initiatives

- Improve BCP effectiveness via more practical drills involving more advanced drill scenarios, more participants, a larger scope, etc.
- Clarify procedures of gathering/communicating/sharing disaster information, perform up-skilling of supervisors and representatives



BCP business group training drill



Wet weather evacuation drill

Intellectual Property Management

The NGK Group encourages the creation of intellectual property (IP) rights and works to ensure proper protection and use of IP rights. In addition, based on the policy of respect for the rights of others and ourselves, it aims for a strategic patent network to be built within the close cooperation between the Intellectual Property Department and other divisions such as Business, Research and Development, and Technology Divisions.

Specifically, it features a patent mapping function to present the internal and external patent landscape of specific technology areas using charts and graphs, which can be easily shared within the Group.

To prevent patent infringement risks, we regularly conduct patent monitoring of other companies for product family and development theme to update our database.

Number of patents held
as of March 31, 2018

National patents
of Japan **3,191**

Foreign patents **4,186**

Responsibilities of the Intellectual Property Department

- Application for/acquisition of IP rights (patent, utility model, design):
Establish IP rights for NGK's research and development achievements to safeguard corporate assets on a legal basis
- Patent search:
Survey the current patent landscape of other companies to prevent patent infringement risks
- Administration and operation of patent management systems
- Administrative work relating to acquired patent rights, including maintenance of rights, payment of patent incentives, and cooperation with patent law firms
- Application for/acquisition and maintenance of trademark rights for corporate logos and product trade names and marks
- Copyright
- In house training of Intellectual Property

Awareness Programs for Managers

NGK has conducted manager class awareness programs to enhance intellectual property strategy in the Business and the Research and Development Divisions.

In March 2017, we held the 9th session of the lecture series "Considering Intellectual Property." Mr. Naoto Kuji, former general manager of Honda Motor's Intellectual Property Department, was invited to give a lecture about "IP Idea Combinations in the Near Future and Open Innovation." The program was focused for the activities of company and the activities of intellectual property under the Fourth Industrial Revolution. 150 employees attended the program.

Promoting Intellectual Property Training

Training for young engineers

E-learning and seminars were provided with the aim of providing basic training for young engineers and of up-skilling for patent applicants.

Also, focusing primarily on young engineers in the Research and Development Department, trainings in patent search methods were conducted. These methods were taught via individual, computer-based practical training.

Further, a new e-learning was provided for employees who write out documents and other materials for the proper handling of copyright.

IP Training Provided in Fiscal 2017

	Intended participants	No. of participants
Primer of Patent law, e-learning	Young engineers	68
Seminars on patent law system (Patent I, II, III)	Young engineers	118
Seminars on license agreement and IP strategy	Employees in charge	10
Seminars to acquire skills for using the IP search program	Employees in charge, engineers	85
Small-group workshop	Young engineers in the Business and the Research and Development Division	108 (total for 9 sessions)
Copyright e-learning	Employees who produce documents and other materials	4,313

Employee Invention Compensation System to Provide Incentives for Employee Inventions

From a legal viewpoint based on the Patent Act and in order to encourage inventions, NGK has established an employee invention compensation system comprised of application incentives, registration incentives, and implementation incentives to fairly compensate employees. Implementation incentives are distributed and paid to the inventors from part of the profits derived from the patents used in our profit-making products.

Group companies in Japan have established a similar employee invention compensation system, thereby seeking to spur the invention promotion initiative across the Group.

To further expand this effort globally, we are working to introduce an employee invention compensation system to overseas Group companies in consideration of local legal systems and labor practices, in order to facilitate employee inventions and protect individual inventors' rights.

Provision against Intellectual Property Risks Overseas

We strengthened IP activity collaboration with overseas Group companies for HPC business (semiconductor manufacturing equipment-related products). We supported FM Industries (a U.S.-based semiconductor manufacturing equipment-related metal products manufacturing group company) by analyzing NGK's technologies and patents with as well as those of competitors.

TOPIC

Overseas IP Training

NGK offers overseas training programs to develop international IP experts, sending young employees to the U.S. and Europe. In 2017, Masashi Yasui from the Intellectual Property Department received his Master of Laws degree from the Munich Intellectual Property Law Center (MIPLC) in Munich, Germany.



Mr. Yasui (left) from the Intellectual Property Department