



NGK INSULATORS, LTD.

Environmental Report

2001



C O N T E N T S

Message from the President	1
NGK and the Environment	2
Environmental Management System	4
NGK's Core Policy on the Environment.....	4
History of NGK's Commitment to Environmental Activities	4
Promotion System for Environmental Management.....	5
Activities Related to ISO 14001.....	5
Environmental Auditing	5
NGK's Environmental Action Plan	6
Measures to Prevent Environmental Pollution.....	7
Employee Education and Development	7
Environmental Accounting	8
Environmental Activities Related to Production	10
Energy Conservation.....	10
Reductions in Industrial Waste	12
Management of Chemical Substances	14
Environmental Activities Related to Products.....	16
Increasing Environmental Friendliness.....	16
Environmentally Friendly Products.....	16
Input and Output Strategies.....	18
Green Purchasing	18
Logistics/Containers/Recycling	18
Communications.....	19
Environmental Data by Plant	20

This environmental report is mainly focused on the environmental protection activities of NGK Insulators, Ltd., during fiscal 2000, starting from April 1, 2000 to March 31, 2001. Consolidated data includes that of manufacturing subsidiaries located in Japan.

Group companies covered in this environmental report include: Akechi Insulators Co., Ltd., Ikebukuro Horo Kogyo Co., Ltd., NGK Filitech, Ltd., NGK Kilitech Corporation, NGK Adrec Co., Ltd., NGK Frit Co., Ltd., NGK Mettex Corporation, NGK Fine Molds, Ltd., NGK Printer Ceramics Co., Ltd., NGK Optoceramics Co., Ltd., NGK Okhotsk, Ltd., Asahi Tec Corporation, Energy Support Corporation, Soshin Electric Co., Ltd.

Our next environmental report will be issued in August 2002.

Corporate Name: NGK Insulators, Ltd.

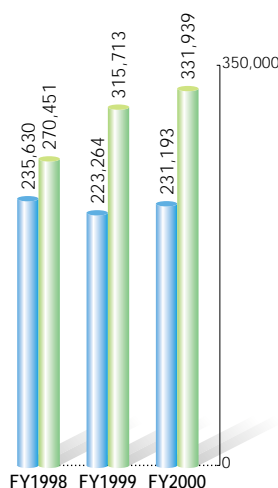
Date of Establishment: May 5, 1919

Paid-in Capital: ¥69.8 billion (As of March 31, 2001)

Nature of Business: NGK uses cutting-edge ceramics technology in the "Triple-E" business fields of "Ecology," "Electronics," and "Energy." NGK is making efforts, as a good corporate citizen, not only to manufacture products that contribute to society, but, based on NGK's medium-term management plan, EXCEL-01, also to provide a high level of disclosure and community relations activities.

■ Net Sales

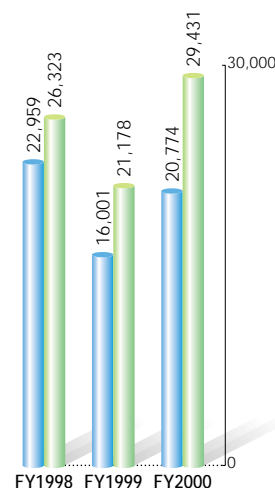
(¥ million)



■ Non-consolidated ■ Consolidated

■ Operating Income

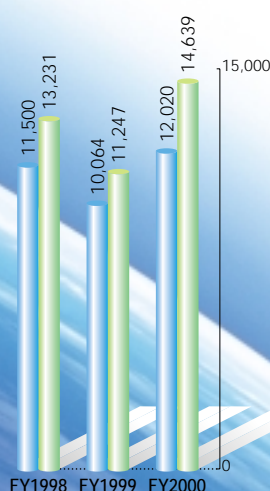
(¥ million)



■ Non-consolidated ■ Consolidated

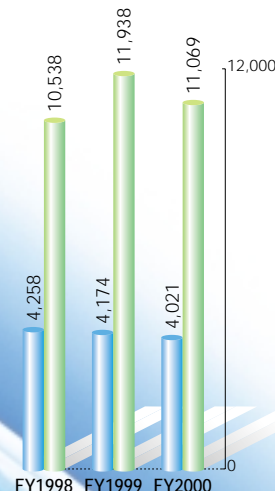
■ Net Income

(¥ million)

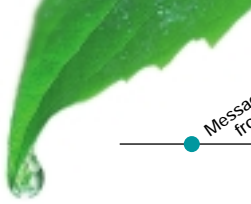


■ Non-consolidated ■ Consolidated

■ Number of Employees



■ Non-consolidated ■ Consolidated



Message from the President

All life forms on earth, from microorganisms to humans, coexist within an environment that depends on energy from the sun. However, the modern industrial society created by humans has put this environment at risk by using up fossil fuels at an alarming rate. These fossil fuels are irreplaceable because they take millions of years for our environmental system to produce. Humans are causing irreparable damage to the ecological balance of the planet by endangering many species, among other problems, such as global warming and the emission of various chemical substances and waste products. As a result, it has become imperative that we change the basic structure of 20th century society, which was based on the three pillars of mass-production, mass-consumption, and massive waste aimed at material abundance and economic expansion. We must find ways to construct a sustainable society in the 21st century.

In Japan, the Basic Law for Establishing the Recycling-Based Society went into effect in 2001, followed by five related sets of legislation. This was an important step toward the creation of a truly sustainable society. Steps such as these will usher in a new era where the nation, local governments, corporations, and citizens will take a more global viewpoint and think more seriously about environmental issues. In the future, it will become essential to (1) develop technologies to transform waste into resources without putting a burden on the environment; (2) create efficient business models, which allow for the economic rationality of recycling businesses and environmentally conscious management; and (3) establish grassroots exchanges that include people from many disciplines and positions in order to achieve these goals.

Against this background, to nurture the health of a viable environment for the next generation, NGK will pursue its Core Policy on the Environment based on the "Triple-E" business fields of Ecology, Electronics and Energy. The key concept of the Company's Core Policy on the Environment is to contribute to the solution of environmental problems through a variety of activities in these three areas. NGK is currently in the process of formulating its medium-term management plan that covers a period of three years starting from fiscal 2002. NGK is putting emphasis on activities regarding environmental protection, mainly in the field of ecology. Some of the environmental issues to be addressed during this time period include (1) the establishment and implementation of ISO 14000 and EMS (Environmental Management System) standards, (2) addressing issues related to new environmental codes, such as the Pollutant Release and Transfer Register (PRTR) Law and the Basic Law for Establishing the Recycling-Based Society, (3) formation and exploitation of an environmental network of local corporations, and (4) qualitative repletion of environmental accounting. An action plan for each year is being drawn up for the achievement of more specific issues.

At NGK, we are working to be a company of excellence with a global business perspective by emphasizing three concepts: Strategic Growth, Competitive Performance, and Corporate Citizenship. To realize this goal, we aim not only to manufacture products that contribute to society, but also to strive for transparency in providing information regarding the environment, as well as strongly promoting environmental protection activities.

December 2001

Masaharu Shibata
President and Chief Executive Officer



NGK and the Environment

- NGK makes efforts to reduce the environmental impact of all business activities, from development and planning to procurement, production, and logistics.
- In addition to using cutting-edge ceramics technologies to create products and technologies that contribute to a better environment, NGK promotes manufacturing techniques that take the environment into consideration.
- NGK strives to reduce the environmental impact of production by conserving energy, reducing waste, and properly managing chemical substances.
- In the ceramics business, the firing process plays an indispensable role in the production process. Therefore, to prevent global warming, NGK has given top priority to energy conservation.

Operating Divisions

Power Business

Insulators, line hardware;
Equipment for power transmission, transformation, and distribution;
Sodium sulfur (NAS®) batteries

NGK's main products in the power business are insulators that allow a stable power supply. These insulators are produced on production lines employing cutting-edge technologies. NGK's advanced technology and high-quality insulators are highly regarded worldwide. In addition, NGK has developed and produced other products, such as devices for power distribution, transmission line arresters, equipment for power transmission and transformation, and NAS® batteries for power storage.



Ceramic Products Business

Ceramics for automobiles;
Ceramics for the chemical industry;
Combustion equipment;
Refractory components

NGK's honeycomb ceramics, HONEYCERAM®, for automotive catalytic converter, is an indispensable component for automobile exhaust gas purification and is the Company's main product line in the ceramic products business. HONEYCERAM® has been adopted by automakers throughout the world and total production amounts to 500 million units. In addition, NGK manufactures and sells ceramic products for the chemical industry, drying furnaces, firing kilns, refractory components, etc.



Engineering Business

Waterworks and sewage treatment equipment;
Solid waste treatment equipment;
Radioactive waste treatment equipment

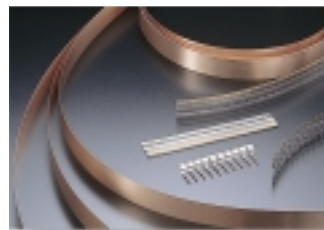
NGK is highly regarded as a "plant engineering maker" covering all aspects of environment-related equipment from design to operation, mainly in sewage treatment. Also, in addition to developing reliable technologies in the field of nuclear power related equipment requiring high dependability, in recent years NGK has been active in the solid waste treatment field.



Electronics Business

Beryllium copper products;
Metal mold products;
Ceramic products for the electronics industry

NGK manufactures and markets a variety of electronics components based on its beryllium copper and ceramics technologies. Beryllium copper, because of its unique properties such as high conductivity and spring performance, is used as a conductive spring material in devices such as personal computers and mobile telephones. Cutting-edge fine ceramics technologies are used in Micro Ceramics components such as piezoelectric actuators for ink-jet printers as well as optical communications-related products and ceramic components for semiconductor manufacturing equipment.

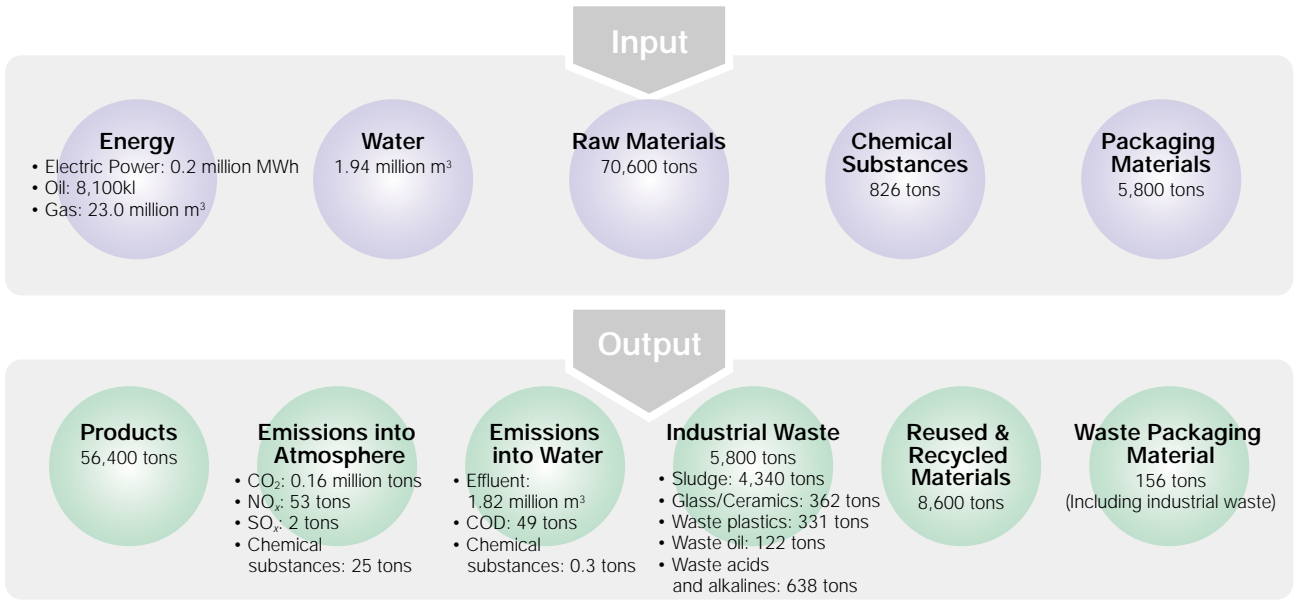


Development & Design

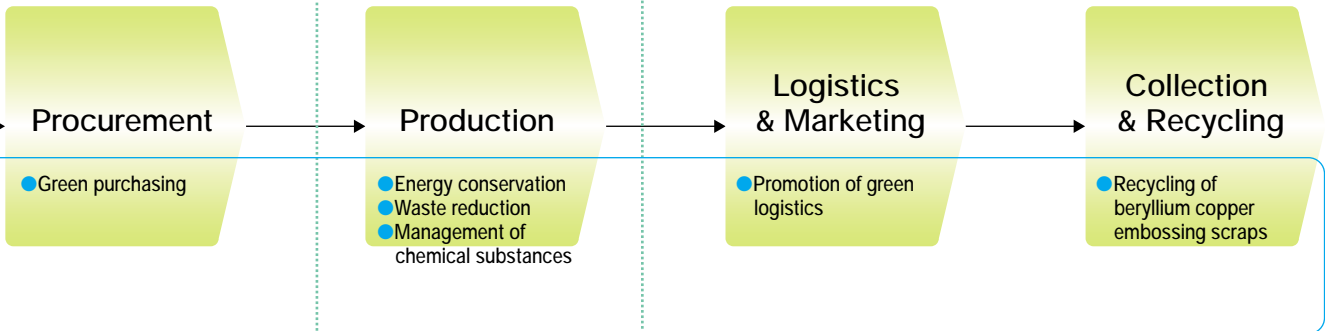
- Development of technologies and products that contribute to a better environment
- Design of environmentally friendly products

Activities of NGK

Main Input/Output in Production

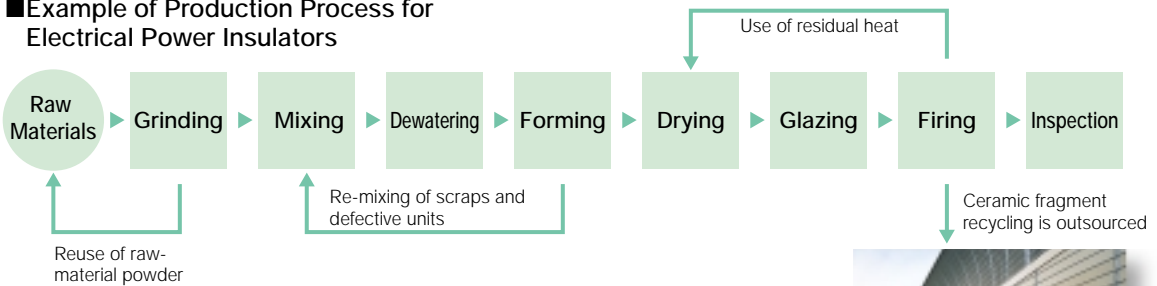


Data from Nagoya, Chita, and Komaki plants



* See page 18

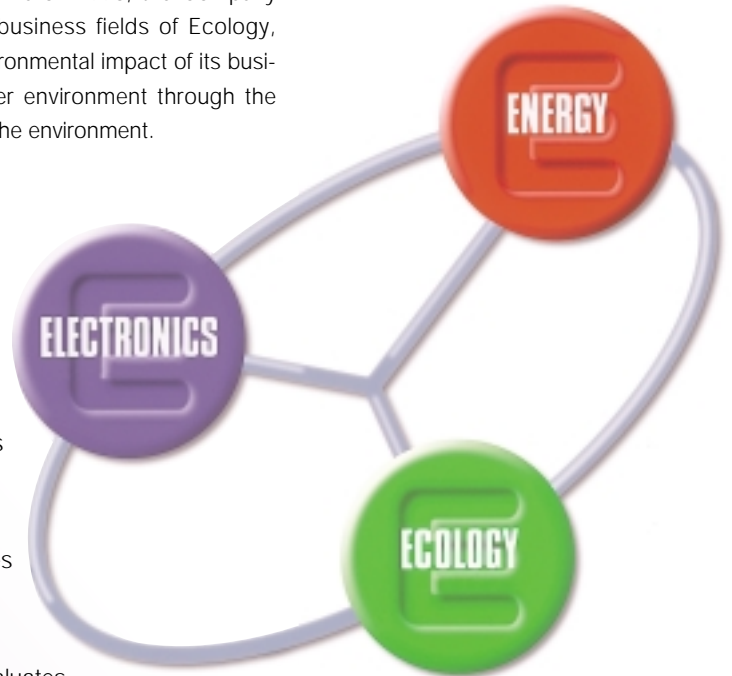
Example of Production Process for Electrical Power Insulators



Sound-absorbing boards made of ceramic fragments

Environmental Management System

NGK views environmental protection as one of the most important issues currently faced by humanity and strives to be a company in harmony with nature. In line with NGK's Core Policy on the Environment, established in March 1996, the Company will continue its business activities in the "Triple-E" business fields of Ecology, Electronics, and Energy. In addition to reducing the environmental impact of its business activities, NGK will actively contribute to a better environment through the development of products and technologies that benefit the environment.



NGK'S CORE POLICY ON THE ENVIRONMENT

Philosophy

NGK's positive approach to the environment begins with a basic corporate philosophy: "NGK products and technologies must create new value and contribute to quality of life." In particular, we focus on the "Triple-E" areas of Ecology, Electronics, and Energy. Through our work in these areas, we seek to develop solutions to some of the critical challenges facing the next generation.

Action Guidelines

In the Design-Review (DR) process, NGK first scientifically evaluates the impact of its production technologies, anti-pollution measures, and waste treatment systems on the environment. Based on our findings, we then take appropriate measures.

Specifically, we:

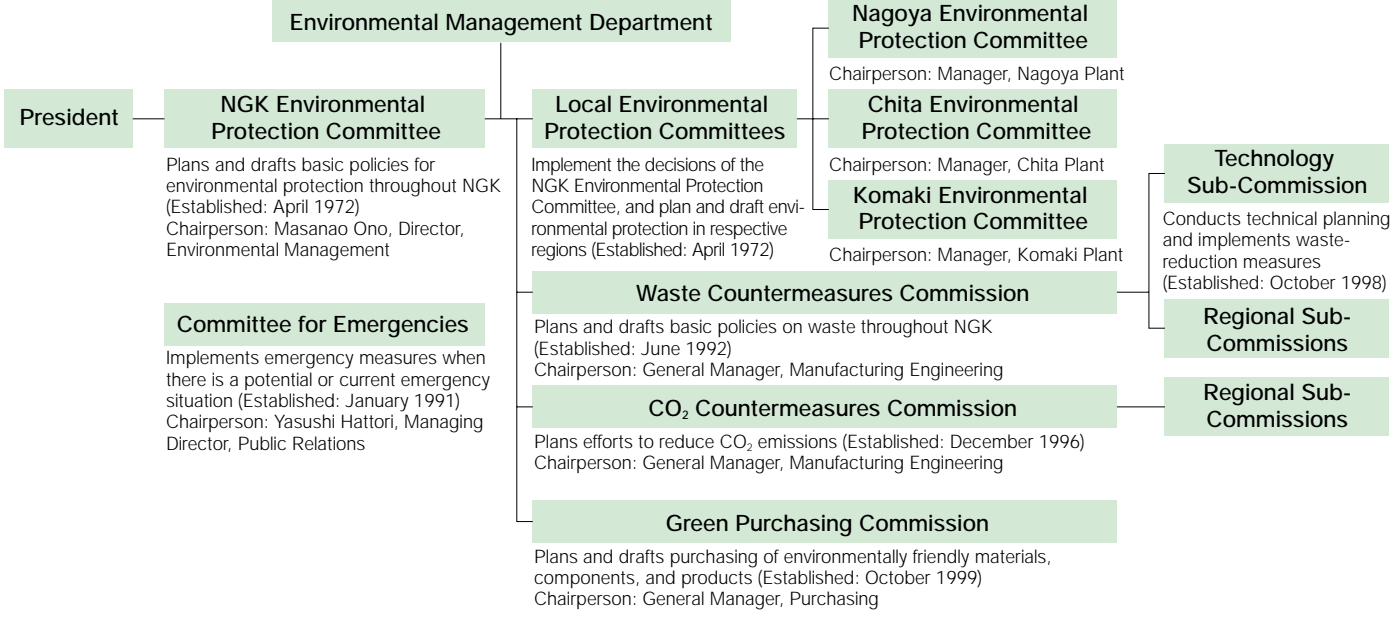
1. Improve the environmental management system;
2. Reduce industrial waste by promoting resource conservation and recycling;
3. Promote energy conservation and reduce emissions of CO₂;
4. Give preference to purchasing environmentally friendly materials, parts, and products;
5. Improve environmental awareness among NGK employees, through educational and informational activities; and
6. Begin Life Cycle Assessment (LCA) of products, in an effort to reduce their environmental impact.

HISTORY OF NGK'S COMMITMENT TO ENVIRONMENTAL ACTIVITIES

1972 (April)	Environmental Protection Committee and Environmental Preservation Office established
1992 (June)	Waste Countermeasures Commission established
1993 (March)	NGK's Voluntary Plan for Environmental Preservation established
1994 (December)	Chlorofluorocarbons (CFCs) and 1,1,1-trichloroethane abolished
1995 (February)	Internal environmental audit conducted
1996 (March)	NGK's Core Policy on the Environment established
1996 (December)	CO ₂ Countermeasures Commission established
1998 (March)	NGK's three production bases simultaneously receive ISO 14001 certification
1998 (June)	Environmental Report published
1999 (June)	Engineering Business Group received ISO 14001 certification
1999 (October)	Green Purchasing Commission established
2000 (February)	Established and began active participation in Environmental Partnership Club (EPOC*)
2001 (March)	NGK's three production bases simultaneously renewed ISO 14001 certification; Renewal in Nagoya was expanded to include its R&D site

* See page 19

PROMOTION SYSTEM FOR ENVIRONMENTAL MANAGEMENT



ACTIVITIES RELATED TO ISO 14001

As part of the Company's efforts to develop long-term, companywide environmental protection activities in line with NGK's Core Policy on the Environment, continuing efforts are being made to acquire ISO 14001 certification. In March 1998, NGK's three main production bases simultaneously received ISO 14001 certification and the Engineering Business Group also received certification in June 1999. In March 2001, NGK's production bases renewed ISO 14001 certification and the R&D site in Nagoya was included when certification was renewed. Due to its nature, the R&D site was examined on its positive aspects. NGK Group companies which have acquired ISO 14001 certification include NGK Adrec Co., Ltd., Soshin Electric Co., Ltd. (Asama Plant), and Energy Support Corporation (Headquarters).

■ Acquisition of ISO 14001 Certification

Certified Production Bases	Date	Certification Organization
NGK		
Nagoya Chita Komaki	March 30, 1998	JIC Quality Assurance, Ltd. (JICQA)
Engineering Business Group	June 25, 1999	Lloyd's Register Quality Assurance, Ltd. (LRQA)
Soshin Electric Co., Ltd., Asama Plant	August 29, 2000	Reliability Center for Electronic Components of Japan (RCJ)
Energy Support Corporation (Headquarters)	June 22, 2000	JIC Quality Assurance, Ltd. (JICQA)
NGK Adrec Co., Ltd.	June 30, 2000	Japan Standards Association (JSA)

ENVIRONMENTAL AUDITING

In February 1996, even before the standards for the ISO 14000 series were established, NGK began independent, internal audits for three plants—Nagoya, Chita, and Komaki. Now, for facilities that have already acquired ISO 14001 certification, 120 internal auditors from other departments conduct audits twice a year, in addition to annual audits conducted by external organizations. There were no major faults found in either the internal or external audits in fiscal 2000.

NGK'S ENVIRONMENTAL ACTION PLAN

In March 1993, along with the establishment of NGK's Voluntary Plan for Environmental Preservation, NGK started environmental promotion through the enactment of the "Triple-E" Plan.

In addition, the Environmental Action Plan was established to strengthen and expand NGK's environmental activities. To achieve this goal, the Company will enhance its efforts in such areas as the reduction of industrial waste and chemical substances, including Group companies.

■ Environmental Action Plan

Item	Intermediate Objectives	Achievements in Fiscal 2000
Measures to prevent global warming and reduce CO ₂ emissions	<ul style="list-style-type: none"> By fiscal 2005, reduce CO₂ emissions on a per net sales unit basis to fiscal 1990 levels 	<ul style="list-style-type: none"> Sales unit basis: 70.0 tons/¥100 million (successfully reduced to fiscal 1990 levels) Examples: <ol style="list-style-type: none"> 623-ton reduction through energy conservation 1,125-ton reduction through boiler fuel conversion (Type-A crude oil to LNG) Consideration of green energy Environmental impact assessment using product Life Cycle Assessment (LCA)
Measures to reduce waste materials and increase recycling	<ul style="list-style-type: none"> To achieve zero generation of waste by fiscal 2005, reduce waste processed in fiscal 2003 to 2,700 tons (a 50% reduction) 	<ul style="list-style-type: none"> Waste processed: 5,800 tons Examples: <ol style="list-style-type: none"> Increased recycling rate of industrial waste: Reduction of 300 tons Improved yield rate: Reduction of 140 tons In-process recycling of waste paraffin: Reduction of 20 tons Green purchasing: 110 product categories specified, reevaluation of recycling yard facilities
Reduction of environmental polluting chemicals	<ul style="list-style-type: none"> Establishment of numerical goals for fiscal 2001 (for reduction of environmental polluting chemicals and emission control) 	<ul style="list-style-type: none"> Constructed a unified management system Determined amount handled, emitted, and transferred of PRTR* designated chemicals
Improvement of the environmental management system	<ul style="list-style-type: none"> Receive ISO 14001 certification by fiscal 2005 at business sites of certain size Assess benefits in environmental accounting by fiscal 2005 at business sites of certain size 	<ul style="list-style-type: none"> Renewed certification, acquired certification in R&D site; the R&D site was examined on its positive aspects Obtained certification for three sites of Group companies Environmental accounting cost tabulation for 14 Group companies
Support of environmental management for Group companies	<ul style="list-style-type: none"> Same level as NGK 	<ul style="list-style-type: none"> Conducted on-site inspections to help improve 14 Group companies Held NGK Group Environmental Liaison Meetings
Education and awareness building activities	<ul style="list-style-type: none"> Cultivate internal environmental inspectors (Total 150) Regularly issue environmental reports and improve content Raise awareness about the environment among employees 	<ul style="list-style-type: none"> Cultivated internal environmental inspectors: 30 trainees (Total 120) Added Management of Chemical Substances, Green Purchasing, and Environmental Accounting to Environmental Report 2000
Corporate citizenship	<ul style="list-style-type: none"> Contribute to environmental preservation activities of local communities as a good corporate citizen 	<ul style="list-style-type: none"> Plant tours and cleanup activities (particularly environment-focused) conducted through EPOC

*See page 14

MEASURES TO PREVENT ENVIRONMENTAL POLLUTION

Our manufacturing plants are working to upgrade their environmental management structures and prevent accidents in accordance with an environmental policy of preventing water, air, and other types of pollution. In addition, we have taken all necessary measures, including providing emergency response education and training, in preparation for the occurrence of an accident.

Strict Adherence to Legal Restrictions

As part of their environment policies, our manufacturing facilities strictly adhere to relevant legal restrictions as well as environmental categories agreed upon with supervising government agencies.

Also, NGK forms pollution prevention agreements with local government bodies and implements independent measures to prevent pollution in accordance with autonomous standards even more stringent than legal restrictions.

In fiscal 2000, there were no instances in which NGK breached legal restrictions and standards. Also, the Company had no recorded instances of pollution-related lawsuits and received no pollution-related complaints from local communities.

Emergency Response

In preparation for an emergency, our manufacturing plants implement education and training based on an annual plan with the aim of minimizing the spread of pollution in the event of an accident. In fiscal 2000, we carried out emergency response education and training that included training for emergency response to photochemical smog and abnormalities in water quality.

EMPLOYEE EDUCATION AND DEVELOPMENT

To protect the earth's environment, it is essential that each individual employee deepens his or her understanding of environmental issues and makes conscious efforts to protect the environment. One of NGK's action guidelines under its Core Policy on the Environment is to carry out educational and public affairs activities to raise environmental awareness among employees. Thus, NGK implements a wide array of environmental education and development activities.

Companywide Education

On a companywide level, we provide overall environmental education to new employees. Also, for employees responsible for product design, we implement educational programs for ensuring compliance with laws and strive to foster a greater awareness of corporate activities and public responsibility. We are also raising environment awareness through an array of enlightening activities, such as in-house newsletters and internal broadcasts specially focusing on environmental problems.

At manufacturing facilities, we are carrying out education on environmental management systems to promote a greater understanding of the intent and content of the environmental policies of each manufacturing site. In addition, we distribute "environment cards," on which environmental targets for each division are listed, as each person records environmental declarations and strives to raise his or her awareness regarding the environment.

Obtaining Various Qualifications

We are focusing on cultivating staff that possesses necessary legal qualifications—including pollution control managers and energy management technicians—for the operation of each business site. We are also providing support that enables employees to obtain such environment-related qualifications as those for environment management system auditor and environmental counselor. The number of staff holding environment-related qualifications as of the end of March 2001 is shown on the accompanying chart.



In-house newsletter introducing green purchasing activities

■ Number of Employees with Environment-Related Qualifications

Senior pollution control manager:	5
Pollution control manager (Air):	67
Pollution control manager (Water):	109
Pollution control manager (Noise):	50
Pollution control manager (Vibration):	23
Pollution control manager (Dust):	5
Specially controlled industrial waste manager:	6
Energy manager:	12
Environmental certified measurer:	6
Intermediate waste disposal controller:	5
Final waste disposal controller:	4

(As of March 31, 2001)

ENVIRONMENTAL ACCOUNTING

In fiscal 1999, NGK introduced environmental accounting as one tool for managing and ascertaining the state of its environmental protection activities. By tabulating and analyzing its environmental protection-related costs, NGK is striving to enhance the efficiency of its environmental protection efforts while attaining continual improvements in these activities.

Analysis and Use of Tabulated Results

(1) Environmental Costs

In fiscal 2000, total environmental costs at three of NGK's business sites in Japan rose approximately ¥200 million from the previous fiscal year, to ¥1.7 billion. This included expenditures of ¥1.1 billion for pollution prevention and other environmental measures and ¥610 million for capital investment.

More than 60% of the total environmental costs were used in business area costs such as pollution prevention costs, followed by management activity costs. These two items account for approximately 80% of total environmental costs.

Specifically, the increase reflected expenses for repairing aged facilities, expenses for obtaining ISO 14001 certification for the R&D site and expenses for upgrading chemical substance management. In addition, NGK made capital investment in various measures to prevent global warming, an issue that has been in the spotlight in recent years. These include conducting research into energy conservation, shifting from heavy Type-A crude oil to fuel LNG for use with boilers, carrying out work for heat conservation and insulation, and introducing Eco-Ice.

■ Environmental Accounting Results (Non-consolidated/Consolidated)

(¥ million)

		Capital Investment			Expenses			Total		
		FY1999		FY2000	FY1999		FY2000	FY1999		FY2000
		Non-consolidated	Non-consolidated	Consolidated	Non-consolidated	Non-consolidated	Consolidated	Non-consolidated	Non-consolidated	Consolidated
(1) Business area costs	Pollution prevention costs	235	240	389	381	460	744	616	700	1,133
	Global environmental conservation costs	133	152	348	0	0	37	133	152	385
	Resource circulation costs	44	45	64	172	196	668	216	241	732
Subtotal		412	437	801	553	656	1,449	965	1,093	2,250
(2) Upstream and downstream costs		0	0	7	0	0	8	0	0	15
(3) Management activity costs		0	0	0	163	256	373	163	256	373
(4) R&D costs		27	169	186	144	54	102	171	223	288
(5) Social activity costs		0	0	2	165	135	186	165	135	188
(6) Environmental damage costs		0	0	3	55	14	20	55	14	23
Total		439	606	999	1,080	1,115	2,138	1,519	1,721	3,137

(2) Environmental Conservation Effects

To determine environmental conservation effects, we have calculated "environmental conservation effects" and "economic effects."

NGK has satisfied all relevant pollution prevention-related standards and was not cited for any incidents of violations of standards. The Company also reduced the volume of CO₂ emissions in terms of emissions per unit of net sales, although the overall volume of CO₂ emissions rose because of an increase in production of ceramic products for purifying automobile exhaust. The Company considered the purchase of green electricity and plans to introduce a program for the purchase of such electricity.

Definition of Environmental Costs and Tabulation Methods

Environmental protection costs are categorized in accordance with guidelines* set by the Japan Environment Agency. For consolidated results, we have calculated figures for NGK as well as 14 domestic Group companies.

Expenses for the development of such environment-related products as water and sewage treatment equipment falls within one of the Company's business domains. Because these are large-amount expenditures that would naturally be incurred in the Company's normal business activities, these expenses are not included in the calculations.

* Developing an Environmental Accounting System (Year 2000 Report)

The volume of waste generated was at the same level as in the previous fiscal year due to increased production of ceramic products for automobile exhaust gas purification systems. However, each production process achieved reductions in waste by improvement of yield and recycling rates.

The direct economic effect of NGK's environmental countermeasures amounted to ¥160 million, due to sales of useful substances.

■ Environmental Effects (Non-Consolidated)

(1) Protection Effects

	Category	Environment Protection Effects		Effects
		Fiscal 1999	Fiscal 2000	
Business Area Effects	Pollution prevention	Below standards; Number of violations: 0	Below standards; Number of violations: 0	
	Volume of CO ₂ emissions (tons)	159,600	161,800	We are progressing with energy conservation efforts that include shifting from heavy Type-A crude oil to the use of LNG as an environmentally friendly fuel for boilers and carrying out work related to insulating and conserving the temperatures of boilers. These efforts enabled a 1,610t-CO ₂ reduction. However, CO ₂ emissions rose 1.4% from the previous fiscal year because of increased production of ceramic products for purifying automobile exhaust emissions as well as higher production of beryllium copper wrought products.
	Basic unit (total amount/sales) (tons/¥100 million)	71.4	70.0	
	Basic unit (total amount/production) (%)	97.3	97.8	
Volume of waste generated (tons)	14,969	14,362	We progressed with waste reduction measures, such as improving the yield rate and the reuse rate of waste material, and as a result achieved a 649t reduction. The total volume of waste generated was at the same level as in the previous fiscal year, owing to a rise in production of ceramic products for purifying automobile exhaust emissions. However, the volume of waste sludge increased, as the Company was only able to recycle a fixed amount of waste sludge.	
Volume recycled	10,225	8,569		
Volume disposed	4,744	5,793		
	Volume of water consumed (10,000 m ³)	211	194	Reduce consumption by implementing water leakage countermeasures and installing water conservation facilities.
Others	ISO-related	Fiscal 2000: Maintain ISO 14001 certification and expand the acquisition of this certification to include R&D divisions		

(2) Economic Effects

Category	Economic Effects (¥ million)	Volume Reduction
Energy conservation	26.7	1,610 ton-CO ₂
Resource conservation (water)	3.1	170,000 m ³
Waste material management & disposal costs	13.4	649 tons
Income from the sale of useful substances	112.2	
Total	155.4	

* Costs are calculated by the difference from the previous year, which were achieved by progressing with activities regarding energy conservation, resource conservation, and waste material reduction.

* Economic effects have been calculated independently.

* We recorded income from sales of useful substances by progressing with recycling measures.

* The following values are used in cost reduction categories (calculated for FY2000)

- Energy conservation: ¥14,000/t-CO₂ Average values of joint implementation activities based on the United Nations Framework Convention on Climate Change
- Resource conservation (water): ¥184/m³ Calculated according to internal changeover units for water, sewage, industrial water, and wellwater at three business sites
- Waste material management & disposal costs: ¥20,700/ton Average values for industrial waste treatment expenses

Future Issues and Directions

Environmental accounting provides vital data for allowing the Company to ascertain the cost-effectiveness of environmental protection countermeasures and for making rational and continued responses needed to protect the environment. In the future, we will strive to raise the effectiveness of environmental accounting as a tool for pressing forward with business operations that consider the environment.

Presently, environmental accounting is being calculated based on surveys of each supervising division. To improve precision, in fiscal 2003 we plan to shift to a system that is linked to an accounting system. In fiscal 2000, environmental costs were calculated only for NGK and 14 other Group companies. However, we plan to expand the coverage of these appraisals to include all consolidated Group companies. We also plan to calculate environmental conservation effects for all consolidated Group companies.

Environmental Activities Related to Production

ENERGY CONSERVATION

NGK takes a multifaceted approach to reducing energy consumption. Efforts to prevent global warming are focused on such production facilities as kilns and include developing or improving combustion technologies to conserve energy as well as shifting to the use of environmentally friendly fuels that reduce the volume of CO₂ emissions. We are also introducing energy-saving equipment when replacing air-conditioning and lighting equipment and, in addition to considering new ways to expand green purchasing, NGK is finding new ways to conserve energy, such as educating its employees on energy conservation.

Change in CO₂ Emissions

NGK's volume of CO₂ emissions has been trending upward together with the increased production of ceramic products, which consume large volumes of energy, as well as the production of other new types of electronics components. In view of this situation, we have reviewed our target values for reducing CO₂ emissions. To this end, in November 2000 we set a new target for reducing the volume of CO₂ emissions by fiscal 2005 as we strive to strengthen our energy conservation activities.

- 1) Basic unit (total amount/sales) is kept within fiscal 1990 level.
- 2) Basic unit (total amount/production) is reduced 10% in existing products such as insulators and HONEYCERAM®.

Energy-Conserving Kiln Furniture

To reduce the amount of energy consumed in the firing process, we have vigorously shifted to the use of lightweight materials that do not retain heat for shuttle kilns. In the 1970s, we shifted from refractory brick to insulating refractory brick, and in the 1980s, introduced the first ceramic-fiber-based kiln furniture. Regarding setters on which products for firing are placed, we have reduced the volume of heat accumulation by using thinner components, which have enabled us to save energy.

Conversion to Natural Gas

NGK is shifting from the use of oil to natural gas when renewing its kilns. Natural gas emits the smallest amount of CO₂ among all fossil fuels, emits no sulfur oxides, and emits extremely low amounts of soot and NO_x.

We have completed the changeover to the use of natural gas at our Chita Plant and are steadily progressing with a changeover at the AC (automotive ceramics) Plant in the Nagoya area as well as at our Komaki Plant. We have also completed a shift to the use of natural gas in boilers at all manufacturing sites.

Example of Energy Conservation—Komaki Plant

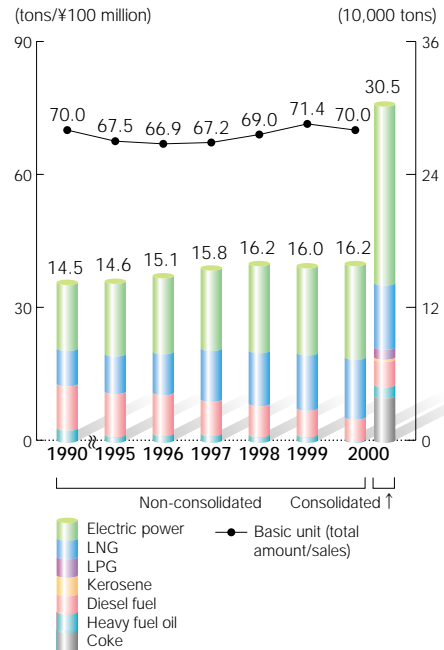
25% CO₂ reduction by the changeover to the use of LNG boilers

In August 2000, the Komaki Plant (Komaki, Aichi Prefecture) which manufactures such products as insulators for electric power transmission, commenced the operation of boilers that use LNG as a fuel. The plant's boilers had traditionally used heavy Type-A crude oil, but to prevent global warming, the Komaki Plant shifted to LNG boilers, which generate only small volumes of CO₂.

These new boilers installed at the Komaki Plant have enabled a 4% rise in boiler efficiency compared with previously used boilers. In addition, during an approximately eight-month period of operation that ended in March 2001, the Komaki Plant reduced CO₂ emissions 34%, to 1,125 tons and also achieved a 19 percentage point improvement in basic unit (total amount/fuel for steam) compared with the same period of the previous year, when heavy Type-A crude oil was used.

When considering the decline in the production volume of insulators, CO₂ emissions for the year are expected to fall 25% from the previous fiscal year, to 1,385 tons.

Change in CO₂ Emissions and Basic Unit



* HONEYCERAM®: A ceramic substrate for automotive catalytic converters developed by NGK for vehicles. It is an important component of exhaust purification systems. Since 1976, when shipments began, 500 million units have been shipped throughout the world. It is made of cordierite material ceramics in a honeycomb pattern, which have superb thermal-shock and heat-resistance properties. It neutralizes hydrocarbons, carbon oxides, nitrogen compounds, and other harmful substances in exhaust emissions by promoting chemical reactions as gas comes into contact with surface catalysts. To improve its purifying functions, the thickness of its walls has been reduced to 0.05mm.



LNG boilers began operation in Komaki Plant

Use of Excess Heat from Kilns

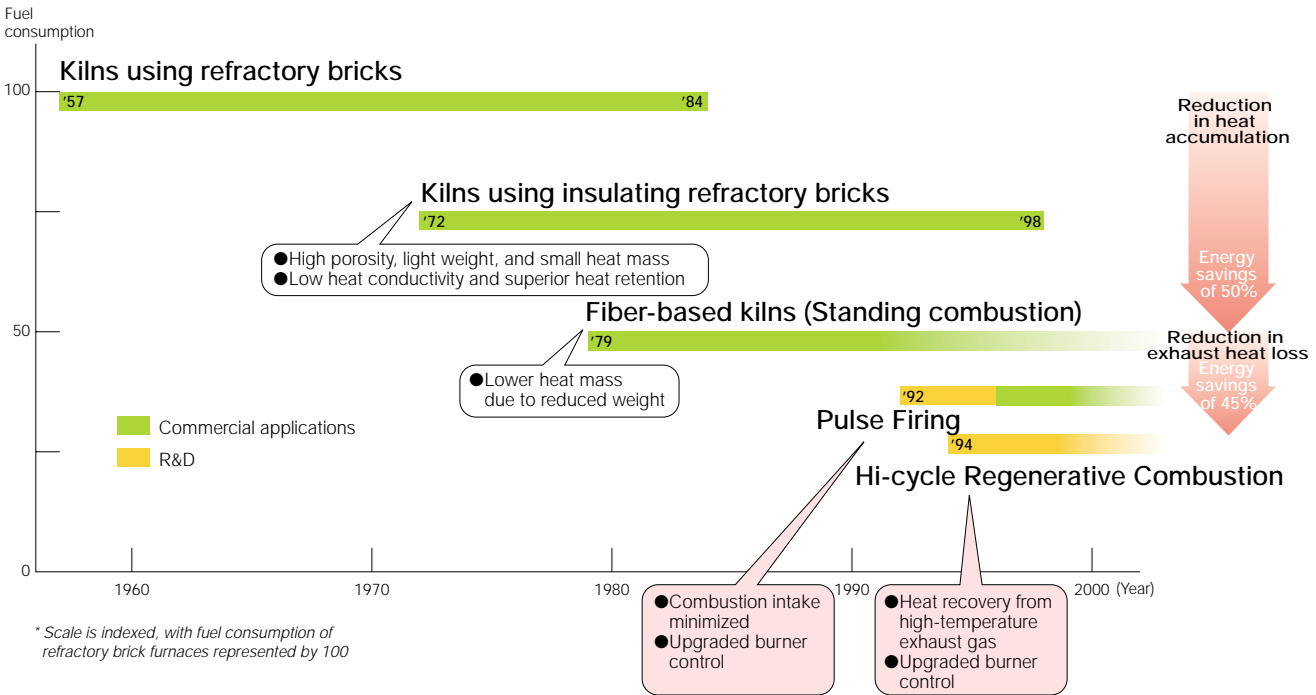
We recover excess heat from kilns and effectively use this heat in a portion of the drying process for formed products.

Energy-Conserving Combustion Systems

In the 1990s, we worked to reduce kiln exhaust gas emissions, progressed with heat recovery from high-temperature exhaust gas, and moved toward the use of computer-controlled intelligent burners. As part of these efforts, we independently developed the Pulse Firing System and the Hi-cycle Regenerative Combustion System.

The Pulse Firing System reduces combustion intake through intermittent operation of the burner. The Hi-cycle Regenerative Combustion System uses a heat reservoir, installed at the burner's outlet, to recover heat from high-temperature exhaust gas. Together, the use of these two systems has enabled a 50% reduction in the consumption of fuel compared with conventional ceramic-fiber-based furnaces and has significantly reduced the volume of exhaust gas, thus contributing to reductions in CO₂ emissions.

Development of NGK's Energy-Conservation Technologies (for Shuttle Kilns)



REDUCTIONS IN INDUSTRIAL WASTE

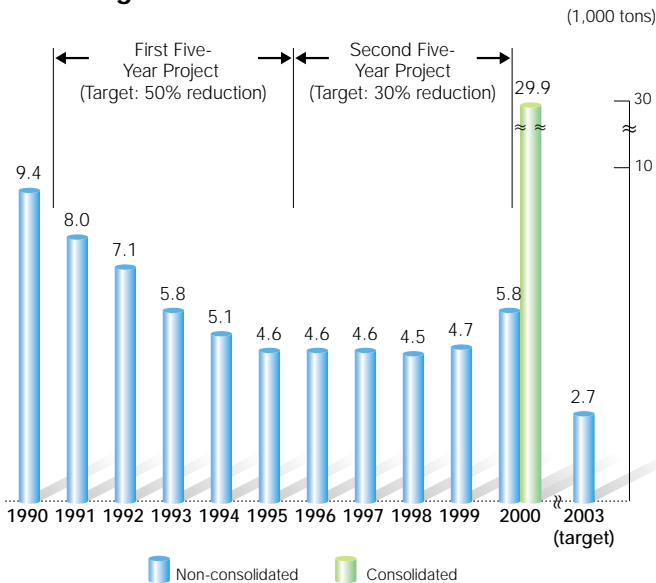
The practice of waste reduction through recycling is rapidly establishing itself throughout society. NGK is strengthening efforts to reduce various types of waste generated during its production processes. Efforts are being stepped up to effectively reuse and render into new resources such products as sludge and glass-ceramic fragments, waste acids and alkalis, and waste plastics, along with efforts to curb emissions.

Volume of Industrial Waste

In the fiscal periods between 1990 and 1995, NGK's First Industrial Waste Reduction Project achieved a 51% reduction in industrial waste for final disposal. In the Second Industrial Waste Disposal Project, we worked to increase this figure by a further 30% by fiscal 2000, but fell short of the new target mainly as a result of increased production and frequent new product launches, which increased the volume of waste generated. A total of 5,793 tons of waste required final disposal in fiscal 2000.

With a view to achieving NGK's goal of zero emissions by 2005, the Company has established an interim goal of reducing industrial waste for final disposal to 2,700 tons by 2003.

Changes in amount of industrial waste for final disposal



Recycling of Industrial Waste

In fiscal 2000, at its three production bases, NGK generated a total of 14,362 tons of industrial waste, of which 8,569 tons were recycled, yielding a recycling rate of 60%, 8 percentage points short of our fiscal 1999 performance. This is due to the fact that although there was an increase in sludge produced due to the increase in production, the Company was not able to increase recycling volume. Below is an overview of current efforts to recycle waste.

Recycling of Industrial Waste in Fiscal 2000 (Non-consolidated/Consolidated)

(tons)

Type of Industrial Waste	Output		Amount Recycled		Recycling Rate	
	Non-consolidated	Consolidated	Non-consolidated	Consolidated	Non-consolidated	Consolidated
Sludge/Waste material	10,118	11,725	5,778	6,095	57%	52%
Glass, Ceramics	3,030	3,938	2,668	3,198	88%	81%
Slag	84	25,191	84	5,229	100%	21%
Waste plastics	331	855	0	5	0%	1%
Waste oil	161	910	39	53	24%	6%
Waste acid and alkali	638	1,654	0	0	0%	0%
Others	0	189	0	3	0%	2%
Total	14,362	44,462	8,569	14,583	60%	33%

Main Use

Sludge/Waste material:	Materials for glazed pipes and roof tiles
Glass, Ceramics:	Refractories
Slag:	Cement materials
Waste oil:	B-class recycled products, Low-energy fuel

Future Initiatives

We are stepping up efforts to increase the recycling of sludge/waste material, waste plastics, and waste acid and alkali—areas in which performance has been inadequate. Sludge/waste material output will be cut back through measures such as improvement of the yield rate, and we will expand ways of reusing it.

Plastics are used mainly in packaging. We plan to increase the use of returnable cases and sort waste plastics more rigorously. To promote thermal recycling,* we plan to improve recycling yard facilities.

NGK is considering measures to reduce sources of waste generation and promote the recycling of waste acid and alkali.

* Thermal recycling: Use of the heat energy generated by the combustion of combustible waste

MANAGEMENT OF CHEMICAL SUBSTANCES

Chemicals are essential to industry and daily life. However, if they are mishandled, there is a risk of harm to the environment and eco-systems. Aware of these characteristics of chemicals, NGK is committed to thoroughgoing safety-oriented management and has created systematic chemical substance management procedures covering all stages of handling from procurement through transportation, storage, use, and final disposal.

Chemical Substances Handling

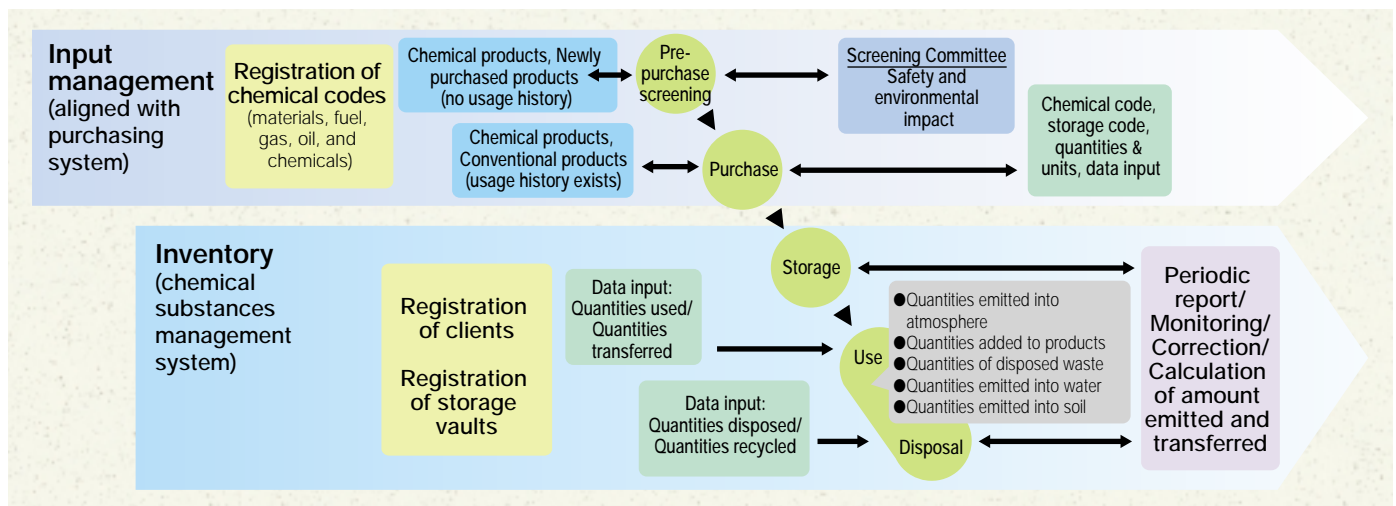
NGK handled 67 chemical substances covered by the PRTR Law* in fiscal 2000 and 12 substances that require reporting. A total of 236 tons of raw materials for metal products and insulator varnish and its related solvents were used. Atmospheric and other emissions from these substances totaled 25 tons, and around 10 tons were transferred to outside the site.

* PRTR Law: Law Regarding the Pollutant Release and Transfer Register

Chemical Substances Management System

NGK's chemical substances management system works in conjunction with its existing on-line purchasing system "AFICS." More than 8,000 chemicals are registered in the system. When the quantities of purchased and consumed chemical substances covered by the PRTR Law* are input, the transferred and emitted amounts of such chemical substances are automatically calculated. Prior to the new purchase of chemicals, comprehensive safety and environmental impact studies are conducted. All purchased chemicals are then carefully stored in one of NGK's approximately 1,200 storage vaults.

■ Chemical Substances Management System



■ Amount of PRTR-Listed Substances Handled, Emitted, and Transferred (Fiscal 2000)

(tons)

Substance (at least one ton handled per year)	Nagoya Plant					Chita Plant					Komaki Plant				
	Amount handled	Amount emitted			Amount transferred	Amount handled	Amount emitted			Amount transferred	Amount handled	Amount emitted			Amount transferred
		Atmosphere	Water	Soil			Atmosphere	Water	Soil			Atmosphere	Water	Soil	
Antimony and its compounds											2.57	0	0	0	0.32
Ethylene glycol	7.64	0	0	0	0.38										
Xylene	3.24	0.84	0	0	2.40										
Chrome and its trivalent compounds						3.47	0	0	0	0	4.20	0	0	0	0.07
Cobalt and its compounds						12.38	0	0	0	0	1.26	0	0	0	0.13
Dichloromethane											9.27	9.27	0	0	0
1,3,5-trimethylbenzene						1.93	0.19	0	0	1.74					
Toluene						2.04	1.93	0	0	0.12	10.92	10.92	0	0	0
Nickel						41.32	0	0	0	1.03					
(Special) Nickel compounds											0.61	0	0	0	0.08
(Special) Beryllium and its compounds						84.02	0	0	0	1.29					
Manganese and its compounds						4.53	0	0	0	0	5.61	0	0.05	0	0.04
Others	2.06	0.92	0.09	0	0.92	1.63	0.60	0	0	0.42	0.54	0.36	0	0	0.04
Total	12.93	1.75	0.09	0	3.70	151.33	2.73	0	0	4.59	34.97	20.55	0.05	0	0.68

(Special): Designated first-grade chemical substances, amount handled: at least 0.5 tons a year

Future Initiatives

In future, we plan to reduce the handling and emission volumes of toluene, dichloromethane, and other VOCs (volatile organic compounds) that are emitted into the atmosphere in large quantities by using substitute materials.

Environmental Activities Related to Products

INCREASING ENVIRONMENTAL FRIENDLINESS

In its Core Policy on the Environment introduced in 1996, NGK decided to begin Life Cycle Assessment (LCA) studies to find ways of reducing the environmental impact of its products. In 1998, it began the full-scale application of its Design-Review (DR) process, which is aimed at minimizing the environmental impact of manufacturing technologies and products during their development.

Design-Review

To produce environmentally friendly products by forestalling potential problems at the design stage, all departments of design, development, manufacture, and marketing, are involved in DR activities at each stage of development. Among the issues addressed in depth are minimizing pollution of the atmosphere and water supply, and curbing industrial waste.

ENVIRONMENTALLY FRIENDLY PRODUCTS

Based on its ceramics technology, NGK develops and supplies a wide range of products that contribute to environmental protection in the "Triple-E" areas of Ecology, Electronics, and Energy. NGK products improve the efficiency of power generation facilities, make automotive exhaust gas cleaner, treat wastewater and waste matter, and help users save energy.

Diesel Particulate Filter (DPF)

The DPF is a filter that eliminates particulate matter (PM) from the exhaust gases of diesel vehicles. NGK modified the technology nurtured in the development of the HONEYCERAM® ceramic catalyst carrier for the purification of exhaust gases of vehicles and developed the DPF cordierite ceramic filter, beginning manufacture and sale of the product in 1989. By alternately blocking off each side of honeycomb cells, the ceramic wall is used as a filter that catches over 90% of the PM in exhaust gases. The accumulated PM is heat-treated, thus maintaining the functionality of the filter.

In addition, in 2000 NGK developed a new kind of DPF that replaces the cordierite materials with more combustion-resistant silicon carbide (SiC) compound ceramics.

NGK's SiC DPFs, created using proprietary combustion technology and a combination of designs, provide solutions to heat-expansion problems. In addition, they are reliable and easy to mass produce at moderate cost. Currently, NGK is constructing production lines with the capacity to produce 200,000 SiC DPFs per year. Production is scheduled to begin in April 2002 and NGK intends to continue to increase production capacity.

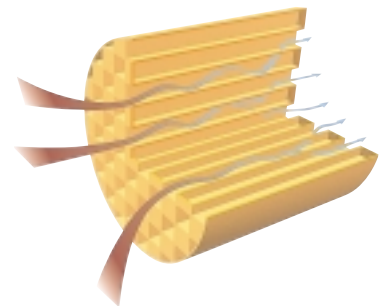
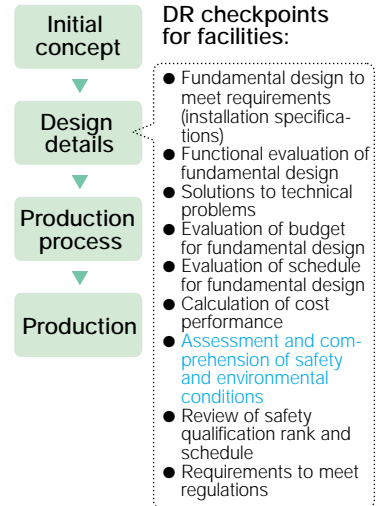
NGK is continuing to conduct R&D with the goal of providing a durable, fuel-efficient solution to the problem of PM for diesel-powered vehicles that brings CO₂ emission volumes below those of gasoline-powered vehicles.

NAS® Battery (Sodium Sulfur Battery)

The NAS® battery is a compact secondary battery for a large-scale energy storage. The battery consists of sodium as its negative material and sulfur as its positive material, and these electrodes are separated by a sodium-ion-conductive ceramic (beta-alumina) solid electrolyte. Because each cell is completely sealed, the battery is environmentally friendly in that it produces no greenhouse gases.

NAS® batteries have a variety of possible applications. Because they are charged during off-peak times and discharge electricity during peak times, they can be used to reduce power fluctuations through load leveling and enable power generation and

DR Flow



Structure of DPF: By alternately blocking off each side of honeycomb cells, the particulate matter (PM) is allowed to accumulate.



Starting in March 2001 in Hachijojima, Tokyo Electric Power Company (TEPCO) has been entrusted by the New Energy and Industrial Technology Development Organization (NEDO) to conduct testing of NAS batteries in conjunction with wind power generation facilities.

transmission facilities to operate effectively, thus allowing postponing facilities expansion. They are also suitable for use as a uninterruptible power supply and an emergency power supply in data centers, factories, and hospitals, and can be used in combination with wind and solar generation systems to stabilize such renewable energy.

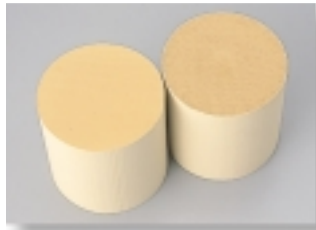
Currently, NAS[®] batteries are test-operating at several locations in Japan. American Electric Power Company (Columbus, Ohio), a major U.S. power company, is now studying the possibility of introducing NAS[®] batteries. This study, which began in January 2001, is the first time a NAS[®] battery has been taken overseas and test-operated there.

■ Environmentally friendly products



NAS[®] Battery

This is a new electrical energy-storage system made using Beta-alumina ceramics. Electricity charges the NAS[®] battery during off-peak times, and this power is discharged during peak times. This system thus reduces power fluctuations by load leveling and improves the operational efficiency of power-generation units and transmission & distribution facilities.



HONEYCERAM[®]

HONEYCERAM[®] is a catalyst carrier used in automobile gas purification systems. By keeping the catalyst on the surface of the device and bringing it into direct contact with the exhaust gas, it converts harmful elements in the exhaust gas, such as HC, CO, and NO_x, into harmless elements.



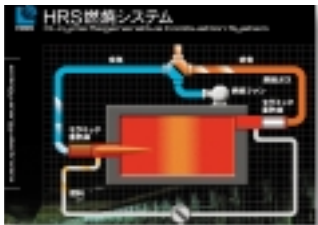
DPF

The Diesel Particulate Filter (DPF) is a ceramic filter that eliminates particulate matter (PM) in the exhaust gasses of diesel engine vehicles. Currently, there are various methods to eliminate PM. The DPF has been developed and commercialized using two types of ceramic material, cordierite and SiC.



Ceramic Membrane Filtration Systems

NGK uses ceramic membrane filters to produce compact and high-performance water purification systems capable of removing viruses and colloids efficiently. Ceramic membranes show high mechanical durability, and there is no elution of impurities. In addition, the ceramic membranes are recyclable.



HRS

The Hi-cycle Regenerative Combustion System is an energy-saving combustion system that contains a ceramic honeycomb to exchange the heat from exhaust gas to combustion air by switching the burner operation mode. This system enables the reductions in fuel consumption and CO₂ emissions.



Filter for High-Temperature Dust Collector, CERALLEC[®]

This high-temperature ceramic dust filter employs NGK's original membrane filtration technology and a honeycomb forming technology. CERALLEC[®] contributes to the improvement of the atmosphere by reducing dioxins produced by kilns and elimination of black smoke from fixed diesel-powered equipment.



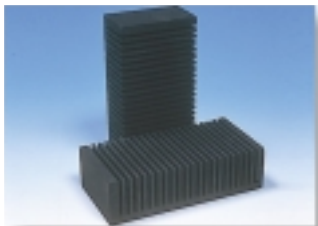
Fluidized Bed Gasification and Melting Systems

The thermal decomposition and gasification of refuse generates gas, which is then used to melt the remaining material at 1,250°C to 1,400°C and turn it into slag. This system lowers fuel use, and reduces CO₂ emissions as well as toxic substances, such as dioxins, more effectively than one that processes incinerator ash in a melting furnace.



EXCERAM[®] Lightweight Setter

EXCERAM[®] is a refractory that is 30% lighter than conventional setters due to the increased porosity of its alumina, cordierite materials. These refractories absorb less heat during the firing process, and can therefore reduce fuel consumption and CO₂ emissions.



Wastewater Treatment Systems for Removing Dioxin Emissions

This system efficiently decomposes and removes dioxins and endocrine disruptors contained in water. Manganese dioxide that is baked onto the ceramic support functions as a catalyst to oxidize, decompose, and neutralize dioxins as well as eliminate Chemical Oxygen Demand (COD).



Permeable Interlocking Block Manufacturing Systems

These systems convert the ash from incinerated sludge produced in the sewage treatment process into highly permeable blocks. These blocks offer an innovative solution to the problems posed by excess rainfall.



Wastewater Treatment System

NGK designs and operates a variety of systems that reduce the volume of waste produced by sewage treatment leaving pollution-free byproducts. One of our more recent advances is a circulating fluidized system, which is both compact and energy-efficient.



CULLET-HISONE[®]

Cullet is a recycled material made from used glass from such sources as used bottles. It makes an efficient sound absorber and is currently used along elevated areas of the Tokyo Metropolitan Subway's Mita line. In 1996, CULLET-HISONE[®] received "Eco Mark" certification from the Japan Environment Association.



Input and Output Strategies

GREEN PURCHASING

To reduce the environmental impact of NGK's corporate activities, including purchasing, NGK has a Green Purchasing Policy which covers all purchased items and services, from office supplies through raw materials and parts to manufacturing facilities.

Through its Green Purchasing Commission, established in October 1999, NGK works in unison with suppliers to put into practice the Company's "Green Purchasing Policy."

Green Products and Suppliers

With regard to office supplies and other everyday consumables, NGK's Green Purchasing activities have been in full swing since fall 2000 and, as of March 2001, approximately 100 products have been recognized as Green Products. NGK's Green Purchasing programs also cover accessories for in-house use, such as work clothes and business cards, and the in-house purchasing system is being revamped to include tools to assist in the selection of Green Products.

With regard to equipment and facilities for production, NGK has completed inspections of suppliers' environmental protection programs and Green Supplier guidance is planned for suppliers rated at levels 1 and 2 (see below). NGK also promotes the use of energy-saving devices in new facilities, such as highly efficient electrical transformers and motors, air conditioners applying Eco-Ice and lighting systems with sensors. In addition, in September 2001, NGK began participation in the Green Power Certification System of Japan Natural Energy Co., Ltd., and will begin purchasing 2 million kWh of wind-generated Green Power per year starting in January 2002.

The Green Purchasing Policy

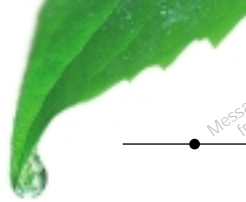
1. NGK conducts green purchasing of all materials, components, manufacturing equipment, office supplies, and services.
2. After considering quality, price, and delivery periods, NGK gives preference to companies that provide products and services in an environmentally friendly manner.

■ Classification of Green Suppliers

- Level 1: Suppliers that comply with the Anti-Pollution Law, the Waste Management Law, and other related laws
- Level 2: Suppliers incorporating environmental conservation into their regular business activities
- Level 3-1: Suppliers making an organized effort to promote environmental conservation
Suppliers planning to apply for ISO 14001 certification and/or those being examined
- Level 3-2: Suppliers who have already received ISO 14001 certification

LOGISTICS/CONTAINERS/RECYCLING

To reduce the burden on the environment due to logistical activities, NGK is promoting Green Logistics. More specifically, this includes activities such as the creation of the basis for a "Returnable Logistics System" wherein returnable containers are used to promote the more effective use of resources and reduce waste. Research is also being conducted on the creation of an efficient operating system to reduce CO₂ emissions.



Communications

NGK's environmental protection efforts are not only confined to the Company itself. Based on the basic policies of the mid-term management plan EXCEL-01, NGK is involved in a wide range of community relations activities as a good corporate citizen and keeps society informed of its various activities through public relations channels.

Environmental Report

In 1997, the Company issued its first environmental report, summarizing its environmental protection activities. It detailed energy-saving activities aimed at preventing global warming, and waste reduction efforts, chemical substance management, green purchasing, and environmental accounting. We plan to continue to publish this report once a year, and also to make it available on NGK's Web site.

Environmental Partnership Organization Club

As a pivotal member of the Environmental Partnership Organization Club, a multi-industrial alliance of companies in the Chubu area dedicated to the development of a sustainable society, NGK vigorously supports the club's educational exchange activities, for which the Company is the coordinating entity.

In fiscal 2000, NGK invited around 40 people to its Komaki Plant to join an "Eco-Tour" enabling them to study environmental technology and see environmental programs in action. We also made a presentation at the "Eco-Campus Festival" to raise environmental awareness among young people.

Community Relations Activities Pamphlet

NGK issued a pamphlet, *NGK Is Also Here*, which introduces NGK's community relations activities in March 2001.

The pamphlet gives an overview in words and photos of activities of the NGK Foundation for International Students, which includes providing accommodation for international students as well as scholarships, NGK's environmental protection activities, plant tours, support for regional events, and activities being undertaken by Group companies at home and abroad.

Awards

Date	Award	Granted to
2000/6	Director-General of Fire-Defense Agency Plant Safety Award for Plants Handling Hazardous Materials	Komaki Plant
2000/9	Industry Week 100 Best-Managed Companies	NGK
	President of Japan Packaging Institute Award	Returnable packaging for wheels of two-wheeled vehicles
2000/11	Okura Washin Memorial Foundation Award	Development and mass production of ultra-thin-wall HONEYCERAM® to eliminate exhaust gas from automobiles
2000/12	Nagoya City Industrial Laboratory Prize for presentation of research results resource recycling production symposium	Development of fusion technology for conversion of municipal garbage to gas
2001/2	Energy Management Achievement Award International Trade and Industry Bureau Chief Award	One member of energy management staff
	Energy Management Achievement Award Tokai Hokuriku Department Chief Award	One member of energy management staff
	Energy Management Excellent Technician Award Chairman's Award	One member of energy management staff
	Energy Management Excellent Technician Award Tokai Hokuriku Department Chief Award	Two members of energy management staff
2001/3	Japan Industrial Water Association (JIWA) Daily Industrial Newspaper, Editor's Award	Development of large ceramic-membrane water purification system



President Shibata presenting "Aiming to Become a Resource Recycling Society" at the Third EPOC Industrial Ecology Meeting in December 2000



NGK Is Also Here introducing NGK's community relations activities



NGK was selected as one of the world's "100 Best-Managed Companies" by U.S. magazine, *Industry Week* due to the Company's new product development based on original technologies and community relations activities.

Environmental Data by Plant

NGK's performance vs. Current pollution control standard

■ Nagoya Plant

	Item	Standard	Actual Value			
			FY1998	FY1999	FY2000	
Exhaust gas	Sulfur produced in combustion (%)	0.1*	≤0.03	≤0.03	<0.04	
	NO _x (ppm)	180	≤72	≤146	≤109	
	Soot and dust (g/Nm ³)	0.15	≤0.002	≤0.005	≤0.005	
Wastewater	pH	5.7-8.7	6.6-7.8	6.7-7.5	6.5-7.5	
	SS (mg/l)	600	5-32	4-53	5-56	
	BOD (mg/l)	600	1-32	1-6	2.6-120	
	Oil (mg/l)	5	N.D.-1.3	N.D.-4.8	N.D.-4.1	
	Copper (mg/l)	3	0.01-0.03	N.D.-0.01	N.D.-0.01	
	Zinc (mg/l)	5	0.07-0.33	0.03-0.04	0.07-0.09	
	Soluble iron (mg/l)	10	N.D.-0.1	N.D.	N.D.-0.1	
	Soluble manganese (mg/l)	10	N.D.	N.D.	N.D.	
	Cyanide (mg/l)	1	N.D.	N.D.	N.D.	
	Lead (mg/l)	0.1	N.D.	N.D.	N.D.	
	Hexavalent chromium (mg/l)	0.5	N.D.	N.D.	N.D.	
	Total mercury (mg/l)	0.005	N.D.	N.D.-0.0012	N.D.	
	Total chromium (mg/l)	2	N.D.	N.D.	N.D.	
	Fluorine (mg/l)	15	0.1-1.4	N.D.-0.1	N.D.-0.7	
	Tri-chloroethylene (mg/l)	0.3	N.D.	N.D.	N.D.	
	Tetra-chloroethylene (mg/l)	0.1	N.D.	N.D.	N.D.	
	1, 1, 1-tri-chloroethane (mg/l)	3	N.D.	N.D.	N.D.	
	Noise	Day (dB)	70	53-69 ¹	54-69 ¹	55-68 ¹
		Night (dB)	60	53-62 ¹	51-60 ¹	42-60 ¹
Vibration	Day (dB)	70	37-55	34-54	45-51	
	Night (dB)	65	35-63	38-56	43-50	
Pumped underground water (m ³ /day)		330	152	118 ²	0	

¹: Including background noise ²: Switching to industrial water in December 1999

Relevant laws and agreements

Exhaust gas: Aichi Prefecture regulations (* Pollution control agreement with Nagoya)

Wastewater: Sewage Water Law

Noise: Regulations of Nagoya

Vibration: Aichi Prefecture regulations (voluntary)

Pumped underground water: Aichi Prefecture regulations

■ Chita Plant

	Item	Standard	Actual Value			
			FY1998	FY1999	FY2000	
Exhaust gas	Sulfur produced in combustion (%)	0.5	Shifted to LNG	Shifted to LNG	Shifted to LNG	
	NO _x (ppm)	150	≤110	≤50	≤43	
	Soot and dust (g/Nm ³)	0.2	≤0.055	≤0.002	≤0.002	
	Total plant output (g/day)		10	0.477-0.571	0.483-0.596	0.388-0.504
		Output concentration in residential areas (μg/Nm ³)	0.01	0.00003-0.00008	0.00005-0.00012	0.00008-0.00030
Wastewater	pH	5.8-8.6	6.8-7.2	6.8-7.5	6.7-7.3	
	SS (mg/l)	30	2-6	1-7	1-8	
	COD (mg/l)	20	2.0-5.0	2.0-4.0	2.5-5.5	
	Oil (mg/l)	2	N.D.	N.D.-0.8	N.D.	
	Copper (mg/l)	1	0.01-0.03	0.01-0.02	0.01-0.05	
	Zinc (mg/l)	1	0.05-0.09	0.02-0.14	0.04-0.12	
	Soluble iron (mg/l)	0.5	0.1-0.4	N.D.-0.1	N.D.	
	Cadmium (mg/l)	0.1*	N.D.	N.D.	N.D.	
	Cyanide (mg/l)	1*	N.D.	N.D.	N.D.	
	Lead (mg/l)	0.1*	N.D.	N.D.	N.D.	
	Hexavalent chromium (mg/l)	0.5*	N.D.	N.D.	N.D.	
	Total mercury (mg/l)	0.005*	N.D.	N.D.	N.D.	
	Total chromium (mg/l)	2*	N.D.	N.D.	N.D.	
	Fluorine (mg/l)	15*	0.1-0.3	0.3-0.5	0.3-0.4	
	Nitrogen content (mg/l)	10**	2.1-6.1	2.7-7.6	2.6-6.9	
	Phosphorus content (mg/l)	1**	0.03-0.21	0.04-0.17	0.02-0.15	
	Tri-chloroethylene (mg/l)	0.3*	N.D.	N.D.	N.D.	
	Tetra-chloroethylene (mg/l)	0.1*	N.D.	N.D.	N.D.	
	1, 1, 1-tri-chloroethane (mg/l)	3*	N.D.	N.D.	N.D.	
Noise	Day (dB)	65	44-63	50-63	49-61	
	Night (dB)	65	42-62	43-62	44-61	
Vibration	Day (dB)	70	<45	<45	<45	
	Night (dB)	70	<45	<45	<45	

Relevant laws and agreements

Exhaust gas: Pollution control agreement with Handa

Wastewater: Pollution control agreement with Handa (* Water Pollution Control Law

** Aichi Prefecture guidelines)

Noise: Pollution control agreement with Handa

Vibration: Pollution control agreement with Handa

■ Komaki Plant

	Item	Standard	Actual Value		
			FY1998	FY1999	FY2000
Exhaust gas	Sulfur produced in combustion (%)	0.6	≤0.09	≤0.10	≤0.09
	NO _x (ppm)	170	≤100	≤120	≤85
	Soot and dust (g/Nm ³)	0.2	≤0.01	≤0.01	≤0.01
Wastewater	pH	5.8-8.0	6.3-7.8	6.3-7.7	6.4-7.7
	SS (mg/l)	80	N.D.-7.0	N.D.-4.0	N.D.-6.0
	BOD (mg/l)	17	N.D.-4.0	N.D.-3.0	N.D.-5.4
	Oil (mg/l)	2	N.D.-0.7	N.D.-0.7	N.D.-1.2
	Copper (mg/l)	3*	N.D.-0.01	N.D.	N.D.
	Zinc (mg/l)	3	N.D.-0.50	0.04-0.67	0.02-1.3
	Soluble iron (mg/l)	10*	0.03-0.24	0.05-0.31	0.06-0.16
	Soluble manganese (mg/l)	10*	N.D.-0.07	0.03-0.06	0.01-0.07
	Cadmium (mg/l)	0.1*	N.D.	N.D.	N.D.
	Lead (mg/l)	0.1*	N.D.	N.D.	N.D.
	Total chromium (mg/l)	2*	N.D.-0.02	N.D.-0.03	N.D.-0.01
	Fluorine (mg/l)	15*	N.D.	N.D.-2.7	N.D.-0.4
	Nitrogen content (mg/l)	10**	1.4-3.0	1.3-2.6	1.4-4.5
	Phosphorus content (mg/l)	1**	0.03-0.30	0.02-0.17	0.01-0.34
	Dichloro-methane (mg/l)	0.2*	N.D.	N.D.	N.D.
Noise	Day (dB)	65	53-63 ¹³	50-63 ¹³	52-64 ¹³
	Night (dB)	55	48-62 ¹³	49-60 ¹³	48-61 ¹³
Vibration	Day (dB)	65	25-36	23-36	29-40
	Night (dB)	60	—	—	—
	Pumped underground water (m ³ /day)	4,023	3,145	2,698	2,274

¹³: Including background noise

Relevant laws and agreements

Exhaust gas: Pollution control agreement with Komaki

Wastewater: Pollution control agreement with Komaki

(* Water Pollution Control Law ** Aichi Prefecture guidelines)

Noise: Aichi Prefecture regulations

Vibration: Aichi Prefecture regulations (voluntary)

Pumped underground water: Aichi Prefecture regulations

Nagoya Plant

- Address: 2-56, Suda-cho, Mizuho, Nagoya
- Products: Ceramic honeycomb substrates for automotive catalytic converters (HONEYCERAM®), NAS® batteries, etc.



Chita Plant

- Address: 1, Maegata-cho, Handa, Aichi
- Products: Insulators, equipment for electrical transmission and distribution, ceramic products for the chemical industry, beryllium-copper strips, ceramic components for semiconductor manufacturing, etc.



Komaki Plant

- Address: 1155, Tagami, Futaebori, Komaki, Aichi
- Products: Suspension insulators for electrical transmission, equipment for electrical transformation and distribution, translucent alumina (HYCERAM®), etc.



pH : Density of Hydrogen Ions
 SS : Suspended Solids
 BOD: Biochemical Oxygen Demand
 COD: Chemical Oxygen Demand
 N.D.: Not Detected
 Be : Beryllium

We are making every effort to recycle resources and protect the environment.



100% recycled paper was used for the text of this publication and for the cover. By reusing old paper, NGK is helping to preserve greenery and making effective use of resources as well as reducing waste.



This report was printed with soy ink, which uses reduced levels of oil-based solvents compared with conventional inks. By using soy ink, we are reducing petroleum-product consumption and cutting emissions of VOCs, a cause of atmospheric pollution during printing. Because vegetable oil is used, waste products break down naturally and quickly, and it is also suitable for recycled paper because of its excellent decoloring properties.



NGK INSULATORS, LTD.

Public Relations Dept., Environmental Management Dept.

E-mail: pr-office@ngk.co.jp

2-56, Suda-cho, Mizuho, Nagoya 467-8530, Japan

Phone: +81-52-872-7181 Fax: +81-52-872-7690

<http://www.ngk.co.jp/>

Published: December 2001

Printed in Japan

2K