ENVIRONMENTAL REPORT

Shin-Etsu

Contents

Greetings

It is my great pleasure to provide this environmental report to the community members closely associated with our company, our customers, shareholders and investors. This report has been published to help you understand the Shin-Etsu Group's efforts in the area of environmental management.

Scientific development in the 20th century has made it possible for many to enjoy affluent lives. At the same time, however, we see some adverse consequences of development, such as environmental pollution and other disruptions. With the 21st century having become the "century of the global environment," it is clear that successful handling of environmental issues will be a central focus for corporate management. In the stock market, too, we can see the trend of "socially responsible investment," in which investors evaluate and select companies on the basis of companies' efforts to deal with environmental issues.

In these circumstances, Shin-Etsu Chemical can point to a record of steady progress in the adoption of environmental countermeasures, with high-priority management objectives of ensuring against risks and securing environmental protection. Over the past 10 years, the Company has invested a total of ¥16.3 billion in environmental protection.

In 1998, we adopted the Environmental Charter, our basic philosophy on environmental protection in every aspect of our business activities. In 2000, many production sites of Shin-Etsu Chemical and our main subsidiaries such as Shin-Etsu Handotai obtained certification under ISO14001, the international standard for environmental management systems. We are undertaking sustained, continual improvement to minimize any negative effects of our business activities on the environment.

As part of these efforts, we are working to develop and manufacture environment-friendly products and are actively introducing equipment and technologies to save energy and natural resources, control the emission of hazardous substances and prevent environmental pollution.

Since 1998, Shin-Etsu Chemical has annually published "The Environment and Shin-Etsu" to help everyone understand our commitment to environmental protection. We continue this series with a new edition because we believe it is our responsibility as a business to spare no effort in explaining and helping you to understand our day-to-day activities as well as our commitment to the products and materials that contribute to maintaining a better environment.

The Shin-Etsu Group recognizes firmly that preservation of the environment is our highest priority. In our offices and factories throughout the world, we will behave as a model corporate citizen while continuing our efforts to preserve the environment, both locally and globally.

November 2001

Chihiro Kanagawa
President & CEO

History of Environmental Countermeasures

Shin-Etsu Chemical has engaged in quality control ever since 1950, quite an early period for such activities. In 1953, we established work manuals and work standards and were awarded the Deming Prize. We received praise from Dr. Deming himself, who stated that in terms of the level of statistical quality control, we ranked "the highest in the world."

In 1970, we established the Environmental Control & Safety Department. Since then, we have been actively engaged in environmental management. In 1996, our Gunma Complex obtained certification under ISO14001, the first achievement of this kind for a major company in the Japanese chemical sector. Currently, each production base of our main subsidiaries and affiliated companies, such as Shin-Etsu Chemical and Shin-Etsu Handotai, has obtained certification under ISO14001, and we are working to ensure that all our plants, including those overseas, obtain such certification.

History of Environmental Measures Taken by Shin-Etsu Chemical

April 1953	Work manuals and work standards formulated.
November 1953	Third Deming Prize received.
September 1955	Education and training committees established.
March 1961	R&D Committee and Chemical Industry Council established.
June 1961	Safety Council established.
October 1961	First safety audit carried out.
November 1966	Health and Hygiene Committee established.
November 1970	Environmental Control & Safety Department established.
October 1971	Wastewater treatment facility completed at Isobe Plant.
March 1972	Large-scale hydrochloric acid recovery facility (by-product incinerator) completed at Kashima Vinyl Monomer plant.
	Fukui Environment Analysis Center established.
November 1973	Control & Safety Countermeasures Department established.
February 1974	Environmental Control & Safety Departments in each plant placed under direct jurisdiction of plant general managers.
August 1975	Environmental Control & Safety Management Regulations and Emergency Response Regulations formulated.
October 1989	CFC Control Countermeasures Committee established.
May 1990	Global Environment Issues Countermeasures Committee established (by reorganizing the CFC Control Countermeasures Committee).
March 1995	Participation in Responsible Care (RC) activities.
July 1996	ISO14001 certification obtained for the Gunma Complex.
August 1998	Environmental Charter adopted.
November 1998	Environmental Report published.
November 1999	Company-wide hearing on environmental issues.
March 2000	ISO14001 certification obtained for all production plants in Japan.
May 2000	Final disposal facility completed at the Gunma Complex.

Domestic/International Developments

1948	The Japan Chemical Industry Association was founded.
1951	The Deming Prize was established.
	The High Pressure Gas Control Law was enacted.
1967	The Basic Law for Environmental Pollution Control was enacted.
1968	The Air Pollution Control Law was enacted.
1970	The Water Pollution Control Law was enacted.
1972	The Law on Industrial Safety and Hygiene was enacted.
1973	The Chemical Substances Control Law was enacted.
1988	The Montreal Protocol was promulgated.
1992	The Global Environment Summit was held.
1993	The Environmental Basic Law was enacted.
	The Law Concerning the Rational Use of Energy was revised.
1994	The United Nations Framework Convention on Climate Change took effect.
1995	The Law for Promotion, etc., of Sorted Collection and Recycling of Containers and Packaging was enacted.
1996	The international standard for environmental management systems, ISO14001, took effect.
1997	The Waste Disposal and Public Cleaning Law was revised.
1998	The Law Concerning the Protection of the Measures to Cope with Global Warming was enacted.
1999	PRTR (Pollutant Release and Transfer Registers) legislation was enacted.
	The Law Concerning Special Measures against Dioxins was enacted.
2001	The Circulated Type Social Formation Organic Act Law took effect.

Positive Promotion of Environmental Management

In August 1998, the Shin-Etsu Group adopted the Environmental Charter to help achieve environmental improvement. The charter sets forth the guiding principles of the entire group, to facilitate progressive environmental management.

Each of our production bases promotes the improvement of its operations by establishing its own environmental policy based on the Environmental Charter. Moreover, each production base has adopted an ironclad business philosophy of putting environmental safety first by, for example, reducing by-products and discharged materials as much as possible. We have also implemented comprehensive countermeasures to prevent explosions and fires, which can have significant negative effects on the environment, as well as serious personal injury.

ENVIRONMENTAL CHARTER

Basic Philosophy

Shin-Etsu Chemical Co., Ltd. recognizes that
protection of the global environment is one of the highest priorities for humanity.
Our goal is to contribute to the creation of
a society capable of sustainable development,
by being fundamentally committed to considering the environment
in all aspects of our business activities.

Action Guidelines

1. In order to promote environmental protection activities, Shin-Etsu organizes and facilitates them to enable it to carry out environmental management activities effectively.

2. Shin-Etsu aims at accurately grasping any environmental effects caused by its business activities, and establishes technically viable objectives focused on the reduction of wastes and harmful materials, conservation of resources and energy, and the recycling of materials. Shin-Etsu regularly revises its goals to pursue continual improvements in its environmental performance.

3. Shin-Etsu observes all applicable regional, national, and international laws, regulations, and agreements related to the environment. Moreover, Shin-Etsu establishes its own standards to prevent environmental pollution.

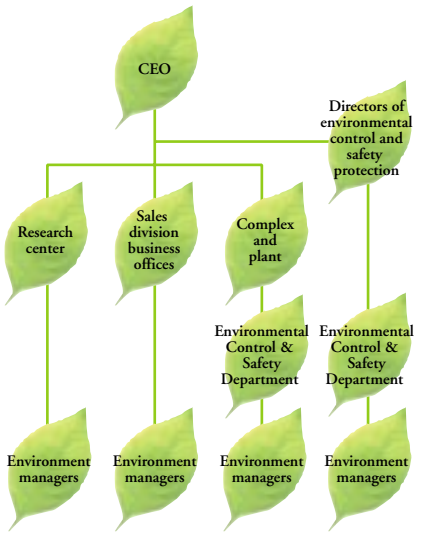
4. Through education and internal communications, Shin-Etsu strives to instill a better understanding among all employees of its environmental charter and raise awareness of environmental issues. Shin-Etsu promotes environmental protection activities from a wide-ranging point of view, expanding from small regional communities to the entire global society.

5. In an effort to minimize any adverse environmental effects in developing new products and technologies, Shin-Etsu aims at assessing their environmental-friendliness, from fundamental research and design to manufacture, distribution, usage, and disposal.

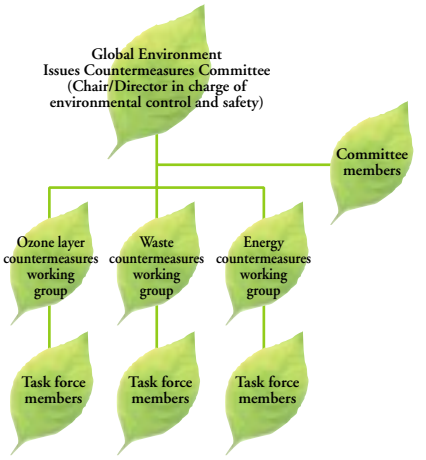
Structure of Environmental Management and Organizational System

The Shin-Etsu Group's approach to environmental protection and specific activities are implemented on a global basis, primarily through the team management of those in charge of the environment and the Environmental Control & Safety Department. In addition, we vigorously promote self-improvement activities related to the environment, through means such as regular environmental safety meetings and committees for taking countermeasures against global environmental problems.

Line Organization



Committee Organization



Internal Audit and Monitoring Systems

We have established a number of organizations and systems at each of our plants to carry out internal audits and monitoring. They undertake their own control activities based on close cooperation between labor and management.

Environmental Control & Safety Audits

Audits are carried out by audit teams that include the director in charge of the Environmental Control & Safety Audit Committee, and technical as well as safety experts. They check the specific content and results of environmental safety measures efforts, and identify future issues through on-site inspection and documentation review. After the surveys, meetings are held to present reports to each plant as well as to the entire Board of Directors. These findings are followed up in subsequent audits.

Safety Examination Committees

These committees consist of key plant staff, including the plant manager. Their tasks are to examine the installation and safety performance of new facilities, examine the environmental and safety implications, and identify areas that require improvement.

Labor/Management Safety Patrols

Key labor and management personnel periodically carry out patrols to check safety conditions at existing plant facilities.

HAZOP

HAZOP (hazard and operability study) is designed to improve work procedures and facilities by attempting to anticipate environmental contamination resulting from malfunctioning production facilities and other equipment problems. HAZOP is implemented by designers and facility managers whenever new facilities are designed, and the results are used to improve safety designs. Existing facilities are also inspected by operators, and their findings are reflected in ongoing improvements to operating procedures and facilities.

External Audit and Inspection Systems

In July 1996, our Gunma Complex became the first major Japanese chemical manufacturer to obtain certification under ISO14001, and in 2000 all our production bases achieved this certification. Currently, our overseas production bases are working to obtain such certification. Recognizing our certification under ISO14001 as a period of renewal, each of our production bases will continue to upgrade its environmental safety activities and strive to reduce negative effects on the environment.

(For details on the Shin-Etsu Group's ISO14001 certification, please see page 17.)

Self-Monitoring and Audit Programs

(Number of cases)

Fiscal year	1985	1990	1995	1996	1997	1998	1999	2000
Environmental control & safety audits	3	4	8	8	11	10	12	12
Safety examination committees	24	51	47	34	53	45	48	50
Labor/management safety patrols	30	30	30	30	30	30	30	30
Number of HAZOP studies	–	–	45	38	41	43	38	35

Environmental Accounting in 2000

Shin-Etsu Chemical has begun to introduce environmental accounting to enhance the effectiveness of its environmental protection activities.

1. The Purpose of Introducing Environmental Accounting

We see the purpose of introducing environmental accounting as follows.

To achieve the maximum effect (environmental efficiency) vis-à-vis costs by quantitatively allocating management materials (investment, expenses) in the area of environmental countermeasures.

To enhance transparency by disclosing our countermeasures related to environmental protection to both internal and external stakeholders.

2. Developments in the Introduction of Environmental Accounting, and the Present Situation

The status of countermeasures concerned with the introduction of environmental accounting is as follows.

Last year, we reported and disclosed the investment cost for environmental equipment for the 10-year period between 1990 and 1999.

This year, we are compiling the costs calculated according to our own methods on the classification basis of the guideline for the introduction of the Ministry of Environment's environmental accounting.

3. Cost Results

Our total investment in equipment was ¥42.1 billion, of which investment in environmental equipment amounted to ¥2.092 billion, or 5.0%.

Environment-related expenses were ¥7.634 billion, equivalent to 3.8% of manufacturing costs.

In March 2002, we plan to disclose our cost results, including a discussion of effectiveness.

Range: Shin-Etsu Chemical Co., Ltd. (Parent Company)
Period: One year (April 2000 to March 2001)
Unit: Millions of yen

Environmental Protection Costs

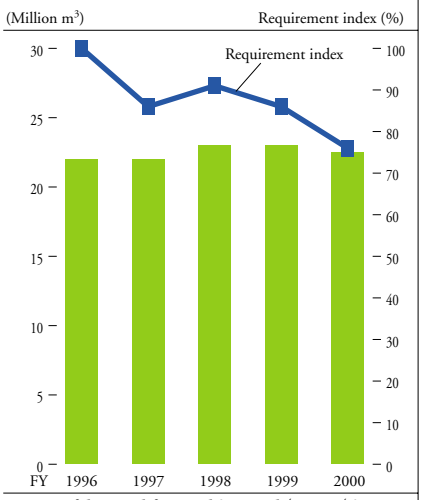
Item	Investment	Expenditure	Main countermeasures
Business area costs			
Prevention of environmental pollution costs	1,706	2,560	Air, the quality of water, prevention of soil pollution, noise
Prevention of global environmental costs	105	516	Energy-saving/global warming, ozone-layer depletion
Resource circulation costs	229	3,347	Countermeasures for waste materials, recycling
Upstream/downstream costs	0	10	Green procurement, wrapping containers
Management activity costs	0	374	Environmental management fees, environmental management system
Research and development costs	35	465	Environmental process development, use of by-products
Social activity costs	17	295	Environmental fee/advance money, environmental pamphlets, regional community cooperation, etc.
Environmental damage costs	0	67	Environmental reserve fund
Total	**2,092**	**7,634**	

Summary of Environmental Activities in 2000

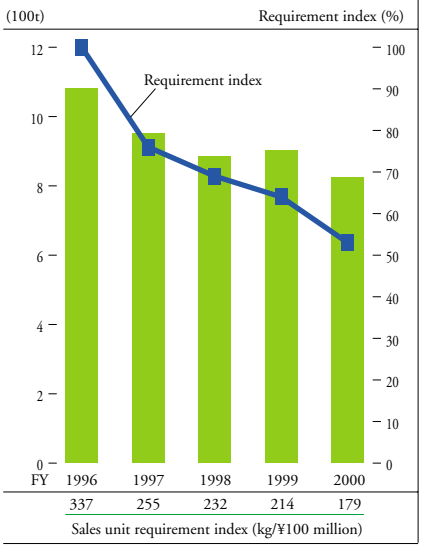
During the process of production, products, by-products, drainage and gas are produced. However, these will be recycled to the greatest possible extent, and non-recyclable materials will be released into the atmosphere or rivers and reclaimed to certain sites for disposal after reduction and purification.

Each of Shin-Etsu Chemical's production bases has identified the themes for controlling and reducing greenhouse gases, saving energy, reducing waste materials and controlling and managing of chemical substances, to cope with environmental issues ranging from regional communities to a global scale.

Total Discharge Wastewater Volume



COD Discharge Volume



Protecting Water Quality and Managing Effluents

Total Discharge Wastewater Volumes and COD* Discharge Volumes

By saving water through recycling, we have succeeded in containing the total volume of wastewater discharged so that it has remained constant, despite increases in production volumes. COD discharge volumes have been falling, even though production volumes are rising.

*COD (Chemical Oxygen Demand)
This is an indicator of the amount of oxygen that is chemically consumed. It represents the level of oxygen required to oxidize pollutants in water using oxidants. It rises in proportion to the amount of contaminants in water.

Preservation of Water Quality and Control of Discharged Water

The water used by Shin-Etsu Chemical can be classified into two types. One is "process water," which is employed mainly to produce and wash products, and the other is "coolant," which is used to water-cool manufacturing equipment. These factory-utilized materials are discharged into rivers, etc., after confirmation that they fall within the standard of the Water Pollution Control Law.

Monitoring of Discharged Water

We maintain the regulation level of all substances in the discharged water, as well as analyze and monitor the pH* value of the discharged water 24 hours a day. We have focused progressively on the issue of curtailment of discharged chloride. Moreover, we regularly analyze other relevant issues while seeking to stabilize the river environment by ensuring the level of water quality in the discharged water.

Discharge Water Monitoring (Gunma Complex)

Inspection method (item)	Frequency	Range of standard values	Normal value
pH	24 hours	5.8–8.6	6.5–7.5
TOD (total oxygen demand)	1 time/4 hours	—	200–300 ppm

Wastewater Analysis Results

Fiscal year	Government requirement	Prefectural requirement	1985	1990	1995	1998	1999	2000	Detection limit
pH	5.8–8.6	5.8–8.6	7.4	6.7–7.6	6.7–7.8	6.3–7.7	6.2–7.7	6.7–8.2	
BOD* (ppm)	160	25–70	8.2	5–14	2.6–22	1.5–35	1.5–34	1–37	0.5
SS* (ppm)	200	20–120	5.1	7.7–13	0–10	4.3–40	4.0–20	2–43	1

(Prefectural requirements vary according to the prefecture in which each plant is located.)

*pH
This is a unit of hydrogen ion exponent (log[H+]) that indicates whether a solution is acidic (less than pH7), neutral (pH7), or alkaline (greater than pH7).
*BOD
BOD (biochemical oxygen demand) indicates the amount of oxygen required for water-borne microorganisms to break down contaminants in water. It is used as an indicator of water pollution.
*SS
SS (suspended solid) indicates the amount of suspended solids in water. Suspended solids cause turbidity, and in large amounts they can affect aquatic life.

Controlling Chemical Substances Properly

Shin-Etsu Chemical complies with all applicable laws and regulations, including notification requirements for new chemical substances* as well as those for a small amount of new chemical substances*. Since the Pollutant Release and Transfer Registers (PRTR) Law was enacted, we have implemented the system by monitoring the quantities of the discharged environmental pollutant. We aim to enhance the system to cope with the submission and disclosure on the basis of the same law, which goes into effect in April 2002. In addition, we have taken countermeasures to reduce discharge of the specified chemical substances. As part of this effort, we plan to seal off the production equipment and introduce exhaust gas incinerating facilities, achieving a large reduction in the specified chemical substances.

*New Chemical Substances
Notifications of new chemical substances are obligatory under the Law Concerning Regulations for the Inspection and Manufacture, etc., of Chemical Substances and the Law on Industrial Safety and Hygiene. The former requires notification to the Ministry of International Trade and Industry, the Ministry of Health, Labour and Welfare, and the Ministry of Environment, and the latter to the Ministry of Health, Labour and Welfare.

*A Small Amount of New Chemical Substances
Even when manufactured and handled in small quantities, use of certain new chemical substances must be notified under the aforementioned laws.

Creation and Provision of Material Safety Data Sheets

To ensure that chemical substances are handled properly for reasons of safety and environmental protection, we prepare material safety data sheets (MSDS) containing as much information as possible about each substance we use. These documents are provided to employees and customers as part of our continuing efforts to protect the environment and maintain high safety standards. MSDS documents are obtained from suppliers of raw materials to facilitate proper handling of these substances by our employees.

Preparation and Issuance of Yellow Cards

Yellow cards* contain information about the appropriate action to be taken by truck drivers in emergencies, such as traffic accidents. We distribute the cards to those involved in the transportation of hazardous chemicals as part of our efforts to ensure that these substances are managed safely while in transit.

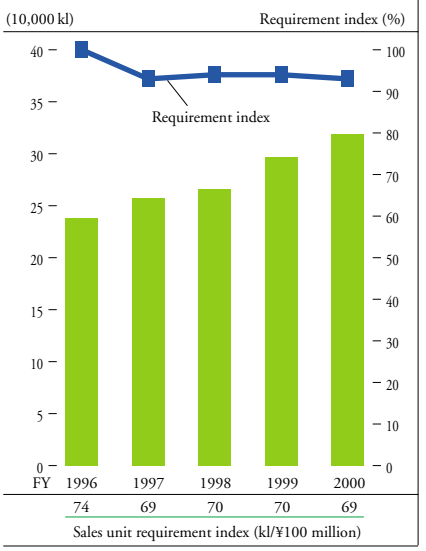
*Yellow Cards
Truck drivers conveying hazardous substances carry the yellow cards. They contain information on the safety precautions for the substances concerned and the appropriate handling procedures, etc.

Change in Activities Relating to Control of Chemical Substances

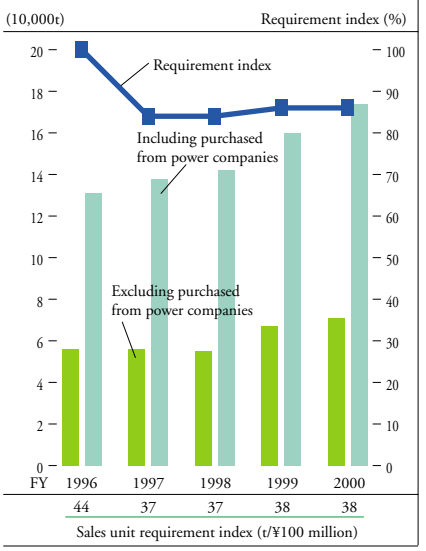
(Number of cases)

Fiscal year	1985	1990	1995	1996	1997	1998	1999	2000	
Material safety data sheets prepared	—	—	4,400	4,900	5,800	6,000	6,900	7,000	
Yellow cards issued	—	—	10	22	90	100	100	120	
Substances subjected to PRTR notification requirement	—	—	20	31	51	53	60	64	Report to industry group on the status of self-management
Small-quantity chemical substance notifications	114	625	566	578	613	598	562	536	Total number of cases regarding the Law Concerning Regulations for the Inspection and Manufacture, etc., of Chemical Substances, and the Law on Industrial Safety and Hygiene
New chemical substance notifications	5	15	8	17	8	11	16	2	Total number of cases regarding the Law Concerning Regulations for the Inspection and Manufacture, etc., of Chemical Substances, and the Law on Industrial Safety and Hygiene

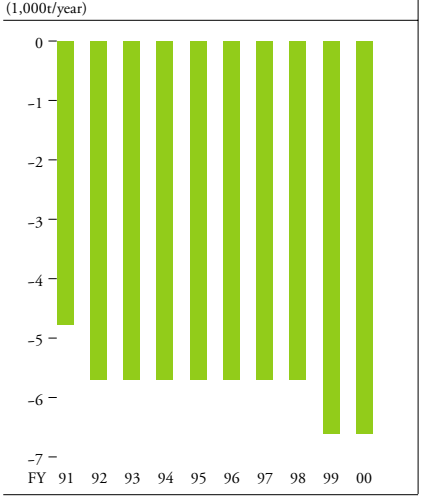
Energy Consumption (Crude Petroleum Equivalent)



CO_2 Emissions (Carbon Equivalent)



Reduction of CO_2 Emissions through Introduction of Cogeneration Systems (Carbon Equivalent)



Achievement of Energy Conservation

Shin-Etsu Chemical uses large amounts of thermal and electric energy as sources of heat and motive power in our production processes such as synthesis, refining, and processing of various products. We are working to meet energy-saving targets with a range of methods to utilize global resources effectively. In the area of thermal energy, we use steam from boilers effectively by introducing technology for collecting emitted heat. In the area of electric energy, we generate electric power by ourselves to minimize the loss of electric energy to the greatest possible extent while seeking to reduce the purchasing of electric energy from power companies.

Furthermore, we are working to boost our energy efficiency by introducing cogeneration systems* and improving our technology and energy uses in a number of ways.

*Cogeneration Systems
Cogeneration systems provide electric and heat simultaneously. They can employ heat produced during electric power generation, decreasing the amount of fossil fuels used and decreasing the amount of greenhouse gases such as carbon dioxide.

Contribution to the Prevention of the Global Warming

Restraint and Reduction of Greenhouse Gases

Shin-Etsu Chemical strives to reduce the discharge of "greenhouse gases" such as carbon dioxide, methane gas, and chlorofluorocarbon gas, which cause global warming. We abolished the use of chlorofluorocarbon gas in our operations in 1995, because it harms the ozone layer.

Reduction of Discharge of Carbon Dioxide by Introducing Cogeneration Systems

Shin-Etsu Chemical actively promotes the introduction of cogeneration systems and utilizes such systems at its Gunma Complex and Naoetsu Plant. With these systems, we can employ energy more effectively, cutting the use of fossil fuels and greenhouse gases such as carbon dioxide. In 2000, carbon dioxide emissions were reduced by approximately 24,000 tons (equivalent to 6,600 tons of carbon), equal to a reduction of 4% in the amount of carbon dioxide produced by our plants and a reduction of 9% in the amount of carbon. Since their introduction in 1988, these systems have decreased carbon dioxide emissions by a total of 250,000 tons (equivalent to 70,000 tons of carbon). As a result of introducing the systems, in 2000, we succeeded in achieving energy conservation of 8,900 kiloliters (calculated in crude petroleum equivalent). We will continue to implement the system vigorously, to utilize it when boilers and electric supply equipment are added or renewed.

Reduction of Other Gas Emissions

Boiler Exhaust

Boilers are used to heat water and produce steam. They combust heavy oil or other fuels with air. The exhaust gases produced include carbon dioxide, as well as small amounts of nitrogen oxides (NOx), sulfur oxides (SOx), dust, and other substances.

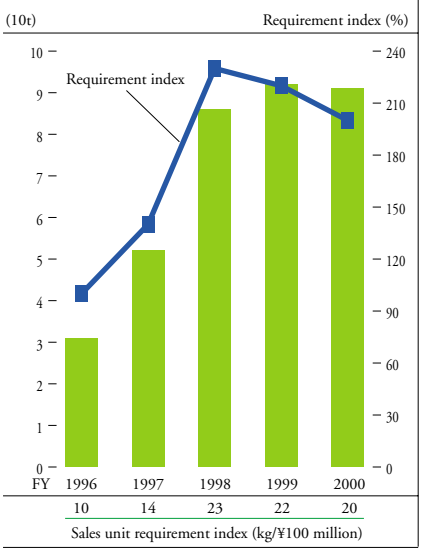
We reduce the amount of contaminants released during combustion by using only high-grade fuels. We also analyze and monitor exhaust gases around the clock to ensure that NOx and SOx levels are below the limits stipulated in laws, local government regulations, and agreements.

Incinerator Exhaust

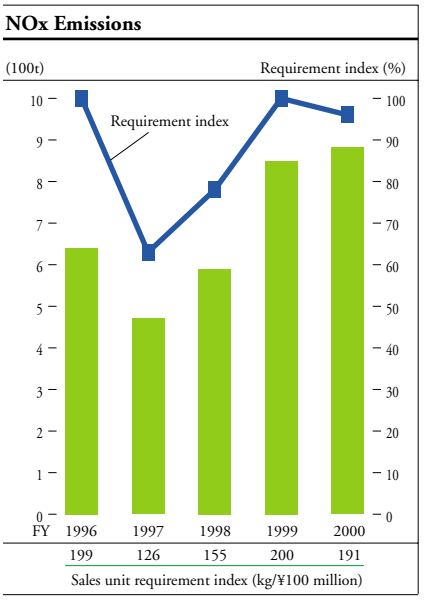
Waste from factory production activities, including by-products, rubbish, waste solvents, and sludge, is burnt in incinerators. The resulting exhaust gases include carbon dioxide, as well as small quantities of NOx, SOx, dust, and trace amounts of dioxins.

Exhaust gases are monitored and analyzed around the clock to ensure that levels of carbon monoxide (CO), NOx, SOx, and hydrogen chloride (HCl) do not exceed the levels stipulated in laws, local government regulations, and agreements.

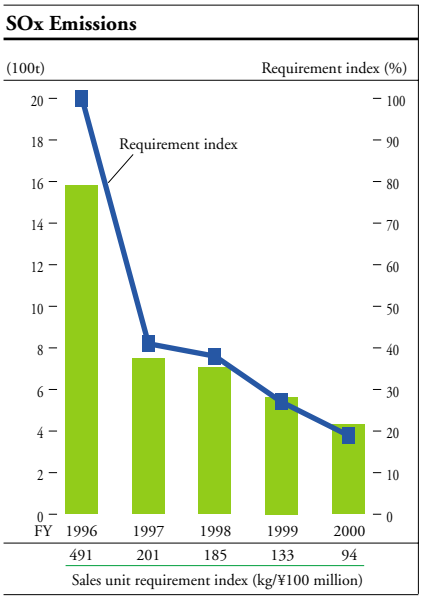
Dust Emissions



NOx Emissions



SOx Emissions



Boiler Exhaust Analysis Results

Fiscal year	Government requirement	Prefectural requirement	1985	1990	1995	1998	1999	2000
Dust (g/Nm³)	0.1–0.25		<0.03	<0.02	<0.02	<0.02	<0.02	<0.002–0.21
NOx (ppm)	150–230	150–230	<200	<200	<150	<150	<150	<60–190
SOx	K17.5	K17.5	<15	<15	<15	<15	<15	<0.6–12.4

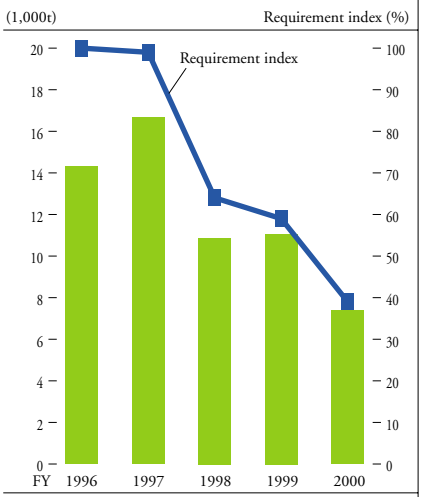
(The standard for boiler NOx varies according to the type of boiler. The range of standard values for the equipment concerned is shown here.)

Incinerator Exhaust Analysis Results (Gunma Complex)

Fiscal year	Government requirement	Prefectural requirement	1985	1990	1995	1998	1999	2000
Dust (g/Nm³)	0.15	0.15		<0.2	<0.2	<0.1	<0.1	<0.1
NOx (ppm)	300	300		<100	<100	<100	<100	<100
SOx	K17.5	K17.5	<2	<2	<2	<1	<1	<1
Hydrogen chloride (mg/Nm³)	700	700		<300	<300	<300	<300	<200
Dioxins (ng/Nm³)	80 (1998.12–2002.11)					<0.01	<0.01	<0.01

(The dust levels stipulated in government and prefectural regulations had been 0.5 until March 1999 but were changed to 0.15 beginning in April 2000.)

Landfill Waste



Reducing Waste and Promoting Recycling

We have promoted a system for processing inorganic sludge to cement materials and the use of waste acid by recycling. As a result of our efforts to meet our goals in accordance with ISO14001, we achieved a 33% reduction of waste, and a final amount of processed waste of approximately 7,400 tons.

Participation in Environmental Activities at the Industry Level

Shin-Etsu Chemical participates in a number of association activities such as the Japan Chemical Industry Association, Japan Responsible Care Council, Vinyl Environmental Council, Plastic Waste Management Institute, and PRTR investigations at the industry level, and official announcements that vinyl chloride is less harmful for the environment, as well as technical improvement activities related to industrial waste and recycling.

Environmental Activity Plans

The Shin-Etsu Group is working on a groupwide basis to continue promoting environmental activities enthusiastically.

Promotion of Energy-Saving

We will increase the efficiency of use of electric power and steam and save energy equivalent to 9,000 kiloliters of crude petroleum through the following improvements and changes, among others.

- Collecting synthetic response heat and recycling it as steam.
- Reducing electric power consumption by adopting a highly effective refrigerator.
- Promoting the heating of raw materials through response products.
- Increasing the efficiency of heating and cooling method processes.
- Continuously promoting the introduction of cogeneration systems.

Achievement of Zero Emissions (Reduction of Waste)

We have reconfirmed that much of the waste from production activities consists of by-products generated through chemical reactions, sub-materials such as solvents, non-response main materials—and for the type of waste, many are organic/inorganic sludge, waste oil, and waste acid. We plan to achieve zero emissions by promoting the reduction of the amounts used and through recycling/reproduction of resources using waste, etc.

- Reproducing resources from inorganic sludge to cement materials.
- Collecting valuable metals and recycling them as raw materials.

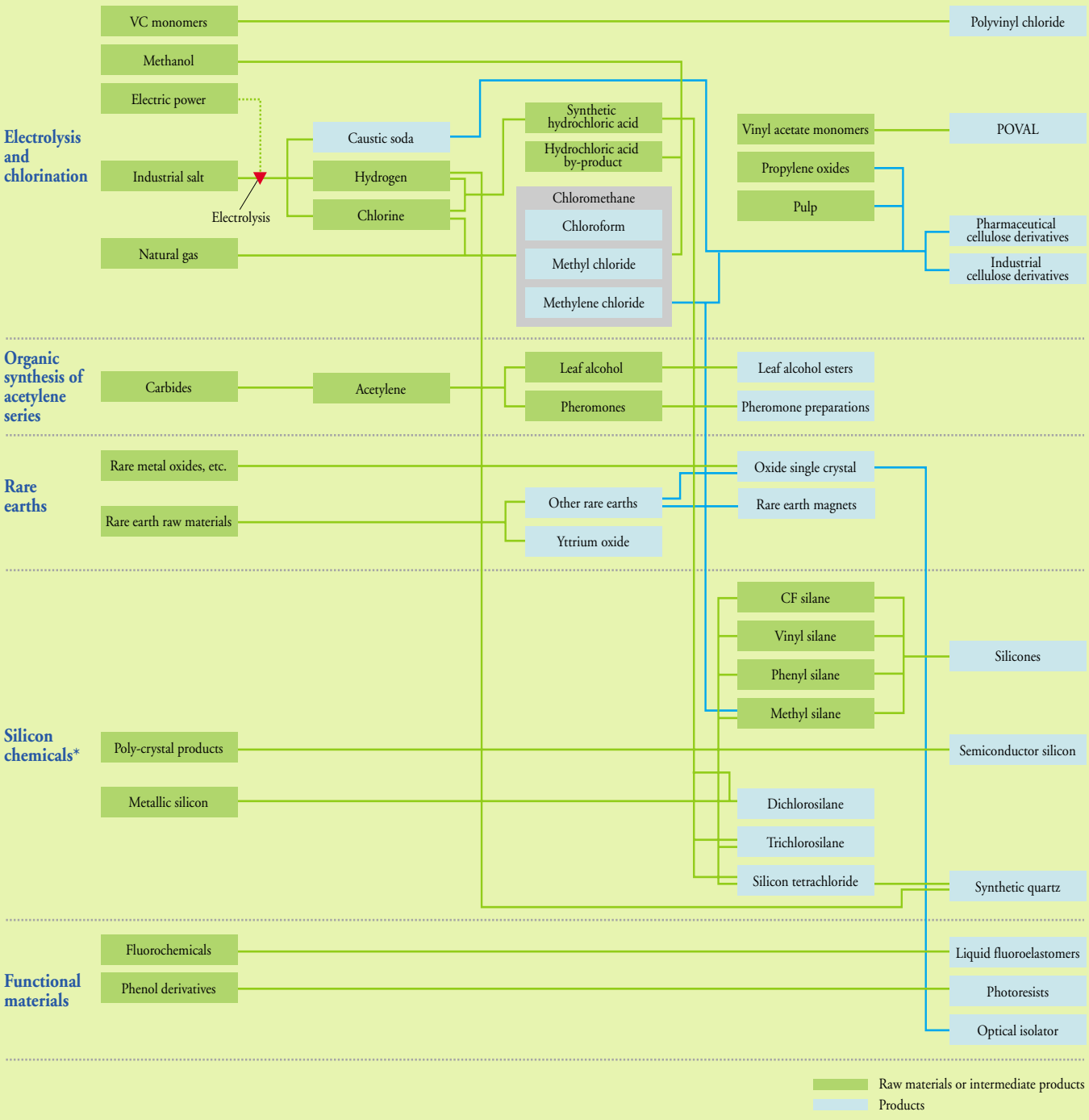
Promotion of Measures for Prevention of Environmental Pollution

We promote measures to prevent environmental pollution, focusing on the following issues to enhance preservation of the water and air, as well as environmental preservation on a global basis.

- Enforcing the measures for the treatment of water to be discharged.
- Reducing greenhouse gases.
- Accomplishing energy-saving.
- Properly treating chemical substances.
- Reducing waste and promoting recycling.
- Noise reduction measures.
- Decreasing the burden on the environment through R&D of new technology.
- Selecting handling standards for chemical substances.

Production Diagram of Main Products

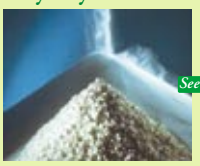
The Shin-Etsu Group aims to expand beyond its role as a chemical manufacturer to become a producer of various high-tech materials as well. At present, it produces polyvinyl chloride, silicones, semiconductor silicon, synthetic quartz, methyl cellulose derivatives, rare earth magnets, and various other products.



*Silicon Chemicals
Chemistry to produce substances of various kinds (silicon) according to the purposes of use by connecting various elements and molecules to the chain formed mainly by alternate connection of silicon (Si) and oxygen (O), as well as by changing the position of the chain.

Eco-Products and Technologies

Since Shin-Etsu Chemical is the largest manufacturer of polyvinyl chloride in the world, its image is that of a petrochemical industry manufacturer. In fact, however, the primary raw material in products such as silicone (silicone resin) and synthetic quartz, which is used to make optical fibers, is silicon, a material that is abundantly present in nature. In addition, the composition ratios of salt and petroleum in chlorinated vinyl are 57% and 43%, respectively, indicating that the petroleum content is remarkably low compared with other plastic products.

Products	Usage	Ecological function	Point of products
Polyvinyl chloride  See Page 14	Polyvinyl chloride materials at large (production process)	Energy-saving	The material comprises salt (57%) and petroleum (43%); the ratio of petroleum is lower in comparison with other plastic products, with minimal adverse environmental effects against the life cycle assessment (LCA)* in comparison with other materials.
	Products such as chlorinated vinyl sash	Energy-saving	Compared with other materials, is better able to insulate against heat; accordingly, enables the saving of fuel for air conditioners and electric power.
	Products such as chlorinated tube	Excellent durability	Compared with other materials, is more durable in general.
Synthetic pheromones  See Page 15	Mating disruptant	Harmonization with ecosystem, ecological agrochemicals	Since it is a synthetic natural substance with minimal toxicity that also decomposes into water and carbon dioxide in the natural environment, it is environmentally friendly compared with former agrochemicals.
POVAL 	Adhesive agent, laundry starch, etc.	Harmonization with ecosystem, water-soluble high polymer	Compared with other materials, is environmentally friendly, since it is biodegradable through bacterial action.
Cellulose derivatives 	Admixture for underwater concrete	Prevents water contamination	Prevents water contamination at the time of construction and enables the reduction of the quantity of effluent.
Rare earth magnets  See Page 15	Compressor motors for air conditioners	Resource-saving, compact in size, energy-saving	Reduces annual electric power consumption. Reduces the quantity of lead.
	Wind-power motors	New energy	Compared with thermal power generation, enables a reduction of the amount of CO_2, nitrogen oxides (NOx), sulfur oxides (SOx), etc., that are generated, and consequently helps prevent global warming and environmental pollution.
	Electric vehicle motors	Clean energy	Compared with gasoline, enables a reduction of the amount of CO_2, nitrogen oxides (NOx), sulfur oxides (SOx), etc., that are generated, and consequently helps prevents global warming and environmental pollution.
Epoxy-molding compound 	Resin encapsulating material for semiconductors	Controls chemical substance generation	By introducing a special silicone hard-combustive system, achieves halogen-free and antimony-free operation.

*Life Cycle Assessment (LCA)
Method to evaluate the degree of environmental influence in the process of production through collection and reuse.

Here we would like to introduce our typical products that help reduce adverse effects on the environment, among the wide range of materials we produce and supply to the market. The ecological functions vary from resource-saving, energy-saving, efficient use of resources through effective recycling, discharge of toxic substances, products in harmony with the environment, protection of petroleum resources, and fusion with ecosystems. Through these products, we continue to work to reduce negative effects on the environment as well as reduce the use of resources such as petroleum.

Products	Usage	Ecological function	Point of products
Silicone *See Page 16* ***Typical form of silicone***  *Form of silicone oil*  *Form of silicone grease*  *Form of silicone resin*  *Form of silicone rubber*	For plastic (modified resin)	Reduces adverse effects on the environment	By not using environmentally hazardous substances, improves safety and is superior to recyclability.
	For tires (modified rubber)	Energy-saving, improvement in fuel charge countermeasures, dust	By improving fuel charges, enables a reduction in the amount of CO_2, nitrogen oxides (NOx), and sulfur oxides (SOx), etc., that are generated, and consequently helps prevent global warming and environmental pollution.
	Water-repellent agent for construction	Reduces adverse effects on the environment, harmonization with ecosystem	By not using environmentally hazardous substances, improves safety.
	Lubrication oil	Energy-saving	Superior to lubrication in low temperature.
	For addition to paints	Resource-saving	Superior to corrosion resistance and weather resistance.
	LIMS (for liquid silicone, injection molding system)	Energy-saving	Energy-saving in the process of the molding and increase in productivity.
	For heat radiation and insulation	Energy-saving and resource-saving	Efficient in energy-saving and reduces the quantity of CO_2, resulting in the minimal use of products.
	For hardening of UV (ultraviolet rays)	Energy-saving, non-solvent agent	Saves more energy compared with heat curing type products.
	Non-solvent type products (for release paper, etc.)	Reduces adverse environmental effects, non-solvent agent	Use of both a solvent agent and dilution solvent are unnecessary, and consequently there is a reduction in capacity and saving of energy at the stage of transportation. Organic solvent is not used, thus the product is safe for humans. Enables a reduction of adverse effects on the environment involving discharge into the atmosphere.

Agricultural Vinyl Film

Since a characteristic of polyvinyl chloride is that even one piece of resin can be processed freely "from soft to hard" according to the purpose of usage, its usage ranges widely from the necessities of life to industrial materials.

Ecological Performance of the Product

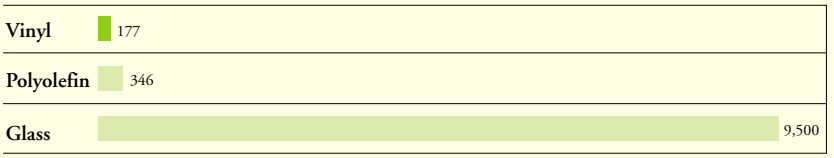
The most remarkable characteristic is the recycling rate of about 51%. More than 50,000 tons out of about 112,000 tons of the used agricultural vinyl film that are disposed of every year are recycled and reused as floor materials and materials for sheets. The incineration rate is 8%, and recycling enables substitution for approximately 40,000 cubic meters of timber, meaning that the product helps prevent the cutting of about 4,000 hectares of forest per year.

Comparison of Agricultural Vinyl Film and Agricultural Polyethylene Film

	Quality of materials	1997	1999
Recycling	Vinyl	45%	51%
	Polyethylene, etc.	4%	17%
Reclamation	Vinyl	26%	26%
	Polyethylene, etc.	21%	30%
Incineration	Vinyl	15%	8%
	Polyethylene, etc.	66%	31%
Others	Plastics	13%	20%

Source: Ministry of Agriculture, Forestry and Fisheries, Agricultural and Horticultural Products Bureau, Vegetable Promotion Section, "The Outline of Investigation Results for Installation Conditions of Horticultural Glass Rooms and Houses."

Quantity of Discharged CO_2 Accompanying the Manufacture of Agricultural Vinyl Houses (per Square Kilometer)



(Unit: Tons)

Source: "Research Report by Kem System, Inc."

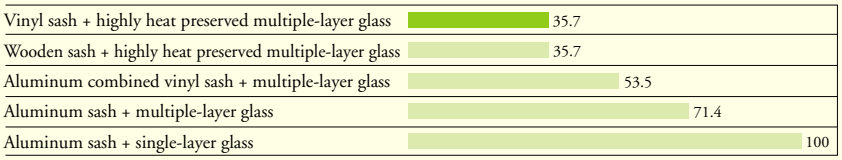
Vinyl Sash

Since polyvinyl chloride is very durable against corrosion and climate, it is used widely in the field of architecture. Above all, vinyl sash is remarkable because of its ability to keep a room warm and preserve heat.

Ecological Performance of the Product

This material is superior in retaining heat; in this regard, it is 1,000 times greater than aluminum. When used as a window frame, it enables a reduction in energy consumption by up to half at the stage of heating and cooling in comparison with our former products. As a result, it can effectively save energy, equivalent to 436 liters of lamp oil (per household annually). In Germany, an environmentally advanced nation, its usage for window frames has become generalized, and the ratio of its usage is over 50%. In Japan, its usage is spreading, mainly among districts that experience comparatively colder weather.

Comparison of the Degree of the Heat Temperature Decrease (Aluminum Sash + Single-Layer Glass = 100)



Source: Japan Building Material Industry Association, "Promotion of Energy Saving Building Materials Diffusion Center."

Eco-Friendly Products (2):

Pheromones

Insect Pest Control Chemicals

Synthetic insect sex pheromone is a significant product that replaces the ordinary method which kills pests using insecticides.

When the pheromone is released in apple, peach, pear, and plum orchards and so on, mating is disrupted, and infestation is prevented.

Ecological Performance of the Product

Because the synthetic pheromone chemicals are made of synthetic natural substances, their toxicity is minimal, compared to conventional insecticides and agricultural chemicals. The synthetic pheromone does not cause environmental pollution, since it breaks down quickly in the natural environment and the decomposition produces only carbon dioxide and water.

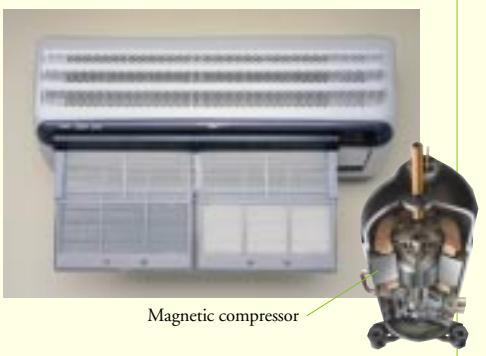
	Classification of poisonous substances, powerful substances and fish toxicity	Chemical structure	Effect on natural enemies
Pheromone chemicals	Normal substances, fish toxicity A	Ordinary carbohydrate	Harmless
General agricultural chemicals	Normal substances, fish toxicity B	Special synthetic substances sometimes including P,S	Very harmful

		Toxicity LD_{50} (mg/kg)		
		Oriental fruit moth	Peach fruit moth	Peach leafminer moth
Pheromone chemicals	Rat	Over 17,120	Over 17,080	Over 5,000
	Mouse	Over 5,000	Over 17,080	Over 5,000
Fenitrothion	Rat	500–800		
	Mouse	1,030		

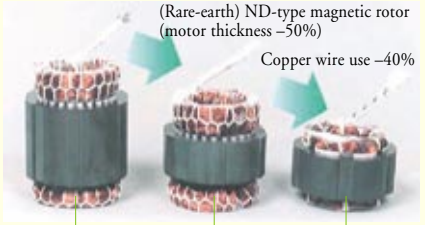
Source: Shin-Etsu Chemical.

Eco-Friendly Products (3):

Rare Earth Magnets



Magnetic compressor



Motors Used for Air-Conditioning Compressors

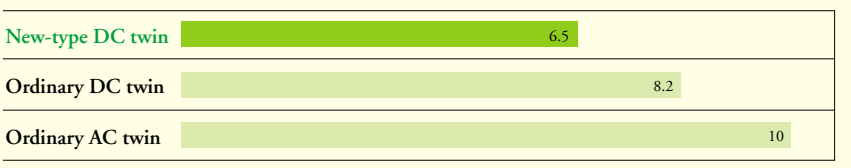
Rare earth magnets are high-performance, permanent magnets whose ingredients are of rare earth type such as neodymium and samarium. They possess a strong magnetic power and are used for the hard disk drives of computers, stereo headphones, as well as motors for factory automation (FA) and office automation (OA) equipment. Also employed for air-conditioning compressors for which a highly efficient motor is essential, they are highly evaluated as a new energy-saving motor.

Ecological Performance of the Product

The reduction of the size and weight of the motors was realized by using rare earth magnets, a high-performance permanent magnet, for air-conditioning compressors. The capacity and weight of the motors was reduced to 85% of the ordinary motors, and the use of the copper wire for the motors was reduced 40%.

In addition, the COP (efficiency of energy consumption) was improved by 5% to 10%, and the amount of power consumption was largely reduced. In this way, we contribute to the achievement of energy-saving, reduction of the amount of discharge of carbon dioxide and the prevention of global warming.

Weight Comparison of Compressors (kg)



Cooperation: Sanyo Denki Co., Ltd./Sanyo Denki Kucho Co., Ltd.

Eco-Friendly Products (4):
Silicone

Non-Solvent Silicone

Silicone (silicone resin) is a highly functional industrial material with both organic and inorganic characteristics. Its various forms include oil, emulsion, and liquid rubber. As people's needs for products of a type harmonious with the environment have increased, we are progressing toward non-solvent silicone such as electricity/electronics and release paper, etc.

Ecological Performance of the Product

Since this is a non-solvent type, it does not require organic solvent such as toluene, which is a subject substance under the PRTR Law. In addition, it can reduce its capacity to 1/10th the original level, and saves energy at the stage of transportation, etc.

Since solvent is not used, it is safe for human beings. Furthermore, it can greatly reduce the adverse effects on the environment caused by its emission into the atmosphere. Moreover, it contributes to the saving of petroleum resources, which is the material in the solvent.

Silicone for Plastic

Applications related to modified silicone resin quality improvement have been developed in a number of fields. A typical example is "Nucycle®," a product jointly developed and manufactured by NEC Corp. and Sumitomo Dow Ltd. This ecoplastic, featuring an additive of silicone flame retardant jointly developed by NEC Corp. and Shin-Etsu Chemical, is employed in the housing of liquid crystal displays and the bodies of personal computers.

Ecological Performance of the Product

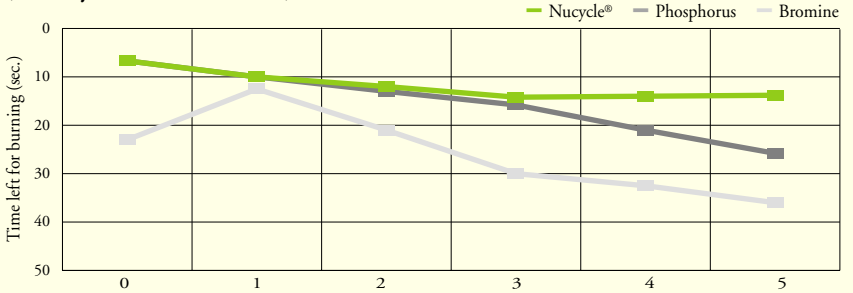
Nucycle®, supplemented by a flame retardant agency of new silicone type, can retard fire to a greater degree than a flame retardant agency adding toxic substances such as halogen (bromine) and phosphorus. Its shock intensity has also been greatly enhanced. Moreover, it can be reused for electric device-related materials such as PC bodies, since it maintains a flame retardant nature even when material recycling is repeated. As such, it contributes greatly to the construction of a "cyclical society."

Recycling Ability of Nucycle®

Characteristics		Before recycling	Recycling 1st time	Recycling 2nd time	Recycling 3rd time
Flame retardant	(UL94, 1.6 mm)	V-0	V-0	V-0	V-0
Bendable intensity	(kg/cm^2)	920	930	940	950
Bendable elasticity rate	(kg/cm^2)	22,800	22,800	22,900	23,000
Stretchable intensity	(kg/cm^2)	650	650	640	640
Heat modification temperature	(°C)	133	133	133	133
Melt flow rate	(g/10 min)	22	22	23	23

Source: NEC Technical Report, Vol. 53, No. 3/2000 Measured by NEC Corp. with the cooperation of Sumitomo Dow.

Flame Retardance of Polycarbonate Added to Various Flame Retardant Agents (Tested by UL, Thickness 3.2 mm)



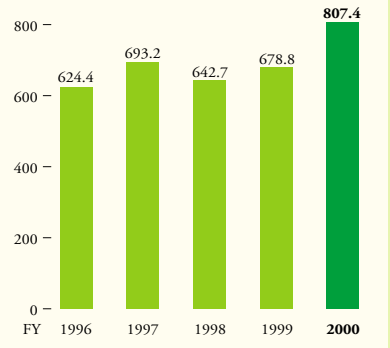
Source: NEC Technical Report, Vol. 53, No. 3/2000
Cooperation: NEC Corp.

Corporate Profile

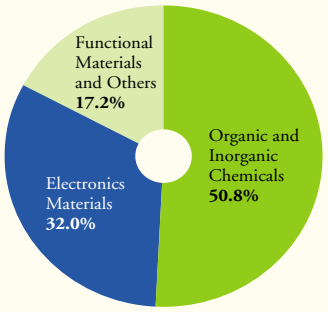
(As of March 31, 2001)

Date of Establishment:	September 16, 1926
Capital:	¥110,247 million (US$ 889 million)
Consolidated Net Sales:	¥807,485 million (US$6,511 million)
Consolidated Net Income:	¥ 64,505 million (US$ 520 million)
Number of Employees:	3,228 (19,398 on a consolidated basis)
Head Office:	6-1, Otemachi 2-chome, Chiyoda-ku, Tokyo 100-0004, Japan Phone: +81-3-3246-5091 Fax: +81-3-3246-5096
URL:	http://www.shinetsu.co.jp
Information:	Public Relations Department 6-1, Otemachi 2-chome, Chiyoda-ku, Tokyo 100-0004, Japan Phone: +81-3-3246-5091 Fax: +81-3-3246-5096

Consolidated Net Sales (Billions of yen)



Net Sales by Segment (Consolidated) (%)



ISO14001 Certification of the Shin-Etsu Group

Company	Plant	Certification Date	Certification Number	Certifying Agency
Shin-Etsu Chemical	Isobe	7/1/1996	JCQA-E-002	Japan Chemical QA
	Matsuida	7/1/1996	JCQA-E-002	Japan Chemical QA
	Gobara	7/1/1996	JCQA-E-002	Japan Chemical QA
	Silicones-Electronics Materials Research Center	7/1/1996	JCQA-E-002	Japan Chemical QA
	Advanced Functional Materials Research Center	7/1/1996	JCQA-E-002	Japan Chemical QA
	Takefu	12/25/1998	JQA-EM0298	Japan Quality Certifying Organization
	Naoetsu	5/31/1999	JCQA-E-0064	Japan Chemical QA
	Kashima	3/21/2000	JCQA-E-0126	Japan Chemical QA
Shin-Etsu Handotai Group	Shirakawa	1/21/1997	E9073	SGS-Yarsley
	Takefu	7/24/1997	E10362	SGS-Yarsley
	Isobe	11/10/1997	E11339	SGS-Yarsley
	Saigata	12/16/1997	E11540	SGS-Yarsley
	Mimasu Semiconductor	1/19/1998	E11804	SGS-Yarsley
	Nagano Electronics Industrial	2/20/1998	E12319	SGS-Yarsley
	Naoetsu Electronics Industrial	7/28/1998	E13930	SGS-Yarsley
	S.E.H. Malaysia	5/7/1998	S027001058	SIRIM
	S.E.H. America	9/25/1998	33486	ABS
	S.O.E. (Taiwan)	11/18/1998	90 104 8198	TUV
	S.E.H. Europe	1/26/1999	E00053	NQA
	S.E.H. Taiwan	8/24/1999	T992009	LLOYD'S
	S.E.H. Shah Alam	9/20/1999	S034301099	SIRIM
Shin-Etsu Engineering	Kashima	3/21/2000	JCQA-E-0126	Japan Chemical QA
Nisshin Chemical Industry		4/24/2000	JCQA-E-0137	Japan Chemical QA
Shin-Etsu Quartz Products	Takefu	1/5/2000	35154	ABS-QE
	Koriyama	6/14/2000	35155	ABS-QE
Naoetsu Precision		10/23/2000	JCQA-E-0187	Japan Chemical QA
Shin-Etsu Vinyl Acetate		3/26/2001	JCQA-E-0246	Japan Chemical QA

Shin-Etsu

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