Pollution Prevention (Products)

◎Concept of the Pollution Preventing Capabilities of Products

Such environmental certification as Germany's BAM or Scandinavia's Nordic Swan Mark set high standards for chemicals contained in and emitted by products. Yet, we have set up an environmental certification that is even more stringent than either of the above in order to minimize the use and emissions of chemicals that are hazardous to the environment. Moreover, in compliance with requests from citizen groups and in line with newly enacted laws and regulations, we have created manufacturing techniques that have less environmental impact.

We control the chemicals contained in our products and the flow of chemicals in the manufacturing process using the Ricoh Environmental and Chemical Safety Information System (RECSIS). We are also developing a system that will provide the timely disclosure of information on the use of chemical substances as requested by our customers, OEM partners, and citizen groups.

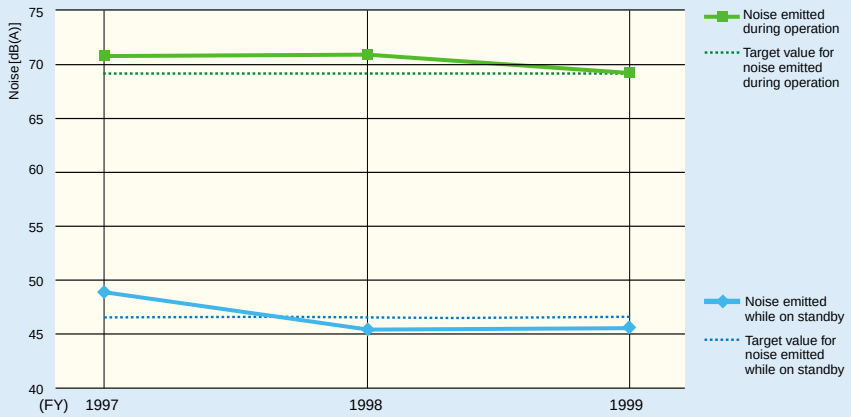
Goals and Progress

- ● Reduce the volume of specified chemical substances, such as lead and PVC, at least 50% on a per product basis in all products introduced in fiscal 2001, compared with products introduced in fiscal 1997.
- ▶ Lead-free solder, polyolefinic harnesses, and hexavalent-chromium-free steel boards are to be used in all products marketed in and after fiscal 2001.
- ● Reduce the level of noise emitted at least 2 dB and emissions of ozone and other by-products at least 20% for all copiers, facsimiles, and laser printers introduced in fiscal 2001, compared with products introduced in 1997.
- ▶ As of fiscal 1999, the level of noise emitted during operation was reduced 1.7 dB and that while on standby was reduced 2.5 dB, compared to 1997 levels. Ozone emissions were reduced 20%, despite a slight increase in dust emissions, compared with those of fiscal 1997.

* Calculations are based on the weighted number of copiers sold and uses a productivity of 50 sheets per minute for all machines.

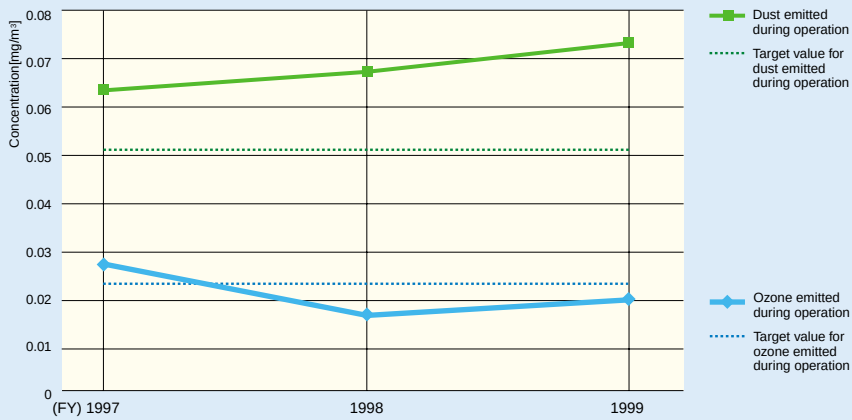
Changes in the Level of Noise Emitted by Machines in Operation

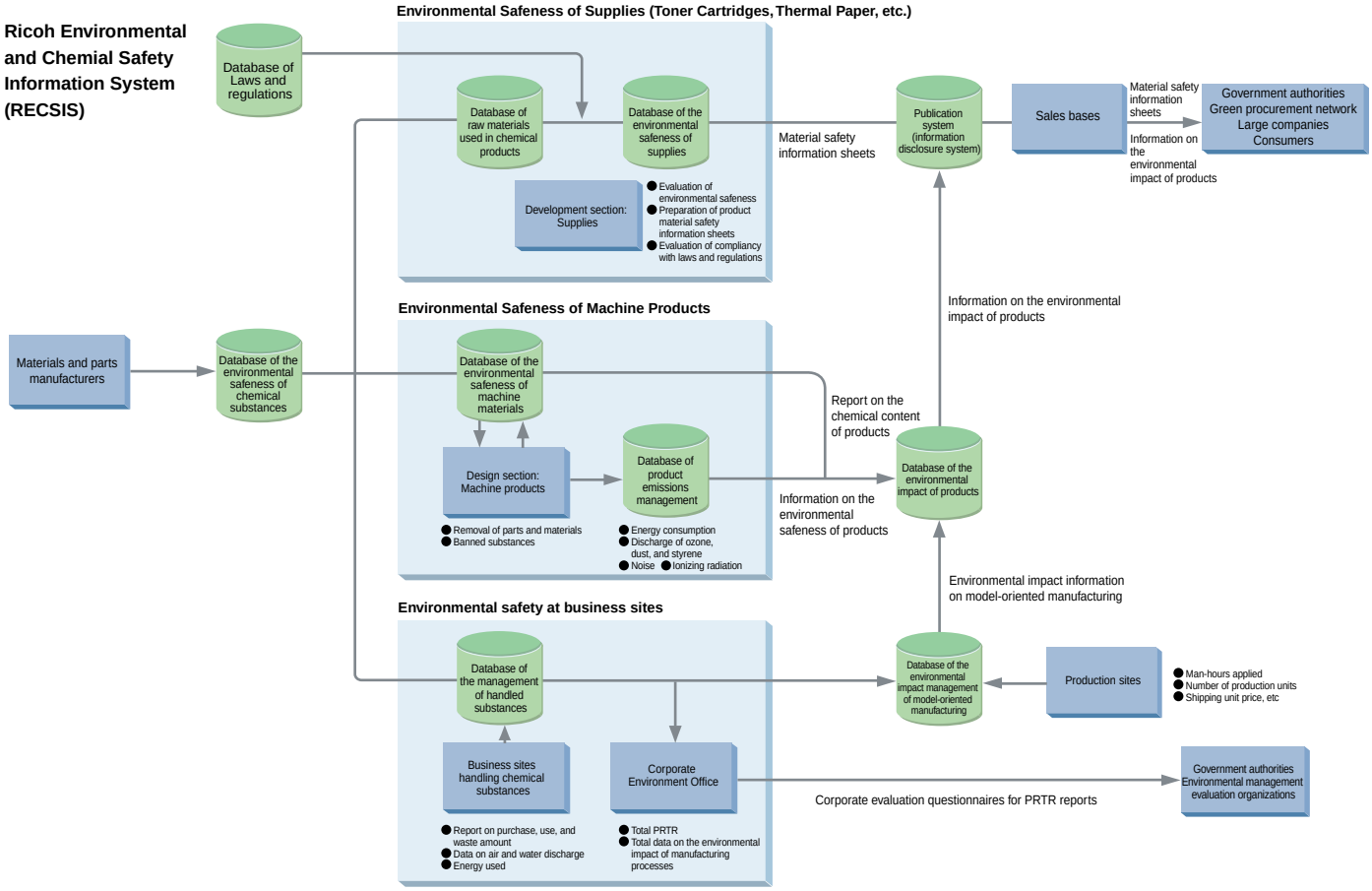
* Calculations are based on the weighted number of copiers sold and uses a productivity of 50 sheets per minute for all machines.



Changes in the Level of Chemical Substances Emitted by Machines in Operation

* Calculations are based on the weighted number of copiers sold and uses a productivity of 50 sheets per minute for all machines.





Ricoh Environmental and Chemical Safety Information System (RECSIS)

There are many substances that, while useful for a product's manufacturing process, have undesirable effects on the environment. The use of these substances needs to be controlled so that they can be properly disposed of, collected, or phased out. RECSIS, Ricoh's chemical substance management system, contains data on 164 items based on such ISO standards as those for the more than 2,000 types of chemical substances listed, environmental hazards, toxicity, and emergency procedures. RECSIS also covers laws and regulations, including amendments, concerning the use of these chemicals in other countries. In addition, we have begun collecting data on the chemical contents of parts and materials purchased by the Ricoh Group and managing data on the use and volume of emissions and waste from chemical substances at the manufacturing sites of our suppliers. Through these efforts, we are now able to improve our products and business sites enough to achieve our pollution prevention targets.

Reduction of Hexavalent-Chromium and PVC

Ricoh has decided to use chromium-free steel boards, which do not need a zinc coating, in all copiers scheduled to be released in fiscal 2001. The company has long been looking for a chromium-free steel board that can perform adequately in electromagnetic wave prevention and intensity but that does not contain harmful hexavalent-chromium, and it has finally developed one that meets these requirements.

The use of PVC has been prohibited in 1993, pursuant to our recyclable design policy, except in materials used to coat electric wire. PVC may produce hydrogen chloride and dioxins, depending on the method of incineration. Using substitute materials for electric wire coating is expected to reduce the use of PVC by 50% by the end of fiscal 2001, compared with products marketed in 1997.

Acquisition of International Certification at Noise Testing Center

Ricoh's Noise Testing Center acquired certification based on ISO standards in 1998. This certification certifies the technical ability of the test center and the reliability of test results reported. Ricoh is the first in Japan to have acquired certification by the National Institute of Standards and Technology (NIST) of U.S.A. on noise testing.

Noise Testing Center in Ricoh Omori

Pollution Prevention (Business Sites)

◎Concept of Pollution Prevention at Business Sites

The Ricoh Group's chemical substance management system categorizes substances that fall under Japan's PRTR* Law as well as substances that are used in other parts of the world according to whether they are to be prohibited, reduced, or controlled. In line with our severe self-regulation policies, we endeavor to control as well as to reduce the amount used, emitted, and disposed of. We have also dealt with soil pollution caused by chloric organic solvents through the use of surveys, improvement planning, and the subsequent publication of the *Ricoh Group Soil Improvement Manual*, which outlines stricter self-regulation measures than the environmental standards set by the Japanese government. We are currently conducting surveys and carrying out improvements at Ricoh Group production and research and development sites.

*Under the PRTR system, the release of potentially harmful environmental pollutants into the air, water, and soil; product contents; and the transfer of waste are assessed by businesses, among others. The results are totaled and released by a third-party organization. Member countries of the Organization for Economic Cooperation and Development (OECD), such as the United States, Canada, the U.K., the Netherlands, and Japan, have adopted PRTR. The PRTR Law in Japan was based on this system.

In fiscal 1997, Ricoh participated in the PRTR system that Keidanren independently started prior to its legislation by giving it a summary of the PRTR data of all Ricoh business sites. We continued to report the PRTR data of all Group companies in fiscal 1998 and thereafter began reducing the consumption and emission of PRTR substances.

Soil Surveys

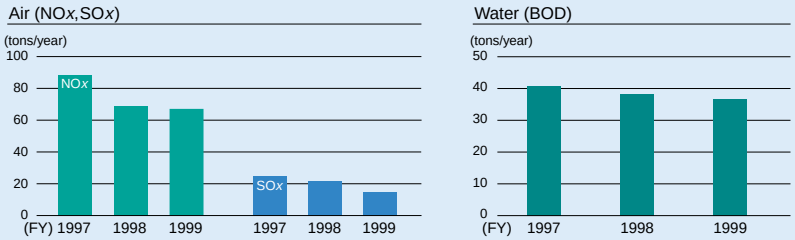
All domestic production and research and development sites of the Ricoh Group conducted surveys of the presence of chloric organic solvents in soil and underground water and reported their findings to relevant local governments. Business sites that needed improvement conducted more detailed surveys and cleanup activities pursuant to the water purification plan. There were no problems in the surrounding areas of any site. Surveys are underway for overseas production sites, and additional surveys and cleanup activities are scheduled to be conducted, depending on results.

Goals and Progress

- The Ricoh Group is to reduce the use of substances subject to PRTR at least 20% and emissions 50% or more, compared with those of fiscal 1997, and completely eliminate landfill waste by fiscal 2001.
- ▶Substance use was reduced 13.2% and emissions 16.7% in fiscal 1999.
- The Ricoh Group is to completely eliminate the use of trichloroethylene and tetrachloroethylene by fiscal 2001.
- ▶The use of trichloroethylene was completely eliminated at all domestic and overseas business sites as was the use of tetrachloroethylene at all domestic business sites. Only one overseas business site currently uses tetrachloroethylene and is expected to completely eliminate its use in fiscal 2001.
- Restrict the use of dichloromethane to the manufacturing of existing organic photosensitive materials by the end of 2001 and completely eliminate its use by the end of fiscal 2007.*

*New addition in year 2000.

Changes in the Amount of Substances Discharged Following the Ricoh Group's Implementation of Pollution Prevention Measures



NO*x* and SO*x* calculations were changed to better reflect fuel consumption performance because data measured at business sites, which was calculated based on the concentration of gas emissions, was dispersed. Therefore, the figures presented above differ from those in the 1999 issue.

Response to Chloric Organic Solution Pollution in Soil and Underground Water*

* The areas surrounding business sites were not affected.

	History of the use of relevant substances[1]	Current status
Ricoh Gotemba	—	—
Ricoh Fukui	—	—
Ricoh Yashiro	—	—
Ricoh Ikeda	○	No pollution[2]
Ricoh Atsugi	○	No pollution[2]
Central Research Center	○	No pollution[2]
Applied Electronics Research Institute	○	No pollution[2]
Ricoh Hatano	○	Cleaning completed[3]
Ricoh Numazu, South Plant	○	Cleaning completed[3]
Ricoh Numazu, North Plant	○	Cleaning completed[3]
Ricoh Omori	○	Cleaning underway[4]
Ricoh Unitechno	—	—
Ricoh Microelectronics	○	No pollution[2]
Ricoh Optical Industries	○	Cleaning completed[3]
Hasama Ricoh	○	Cleaning underway[4]
Tohoku Ricoh	○	Cleaning underway[4]
Ricoh Elemex, Okazaki Plant	○	Cleaning underway[4]
Ricoh Elemex, Ena Plant	○	Cleaning underway[4]
Ricoh Keiki	○	Cleaning underway[4]

1. ○ = Available — = Not available
2. No pollution: No pollution exceeding environmental standards was detected inside or outside the business site.
3. Cleaning completed: Pollution exceeding environmental standards was detected, and site was cleaned.
4. Cleaning underway: Pollution exceeding environmental standards was detected, and site is being cleaned.

Development of Water-Based Paint

Ricoh Industrie France has developed a water-based paint that has been in use since November 1998. The use of the paint lowered the emissions of volatile chemical compounds 83%, compared to those from solvent-based paint that was previously used in the manufacturing process of products. The lower temperature and shorter time needed to bake on water-based paint reduce costs and energy requirements. As a result, annual cost dropped approximately EU27,000, or ¥2.8 million.

Solvent Gas Collection and Disposal Devices

To reduce the usage or emissions of PRTR substances, Ricoh Fukui uses a device to collect and recycle organic solvent gas generated in the manufacturing process. The plant uses a direct solvent gas burner to reduce the amount and density of emitted gas, which is further treated in a deodorization process.

Direct solvent gas burner

Preventing the Evaporation of Washing Solution

To prevent the washing solution used in cleaning parts from evaporating, and thereby reducing cost, Ricoh Optical Industries float plastic balls approximately 2 cm in diameter on the surface of the solution. An experiment showed that evaporation would be reduced by half using this technique.

Survey Results on Substances* Subject to PRTR and the Self-Regulation of Exhaust Pollutants in the Ricoh Group

* Substances designated by five electric/electronic organizations and not covered by the PRTR Law.

(tons/year)

Substance	Amount	Emission in Air	Amount Consumed	Amount Reduced	Amount Transported (Waste Taken Off-Site)	Amount Recycled
Zinc chloride	43.4	—	41.1	—	—	2.3
Zinc oxide	143.1	—	141.3	—	1.0	0.8
Antimony oxide	12.0	—	11.4	—	0.4	0.3
Xylene (mixture)	12.3	10.0	0.1	0.0	0.9	1.3
Dichloromethane	234.3	180.7	—	—	2.9	50.8
N, N-dimethylformamide	26.3	1.2	—	—	—	25.0
Tetrachloroethylene	6.3	0.1	—	—	—	6.2
Copper I oxide	2.4	—	2.4	—	0.1	—
Copper II oxide	110.3	—	108.9	—	0.8	0.6
Trichloroethylene	2.7	0.9	—	—	—	1.8
Toluene	1,124.0	530.8	65.4	166.2	2.0	359.6
Nickel sulfate	12.1	—	5.2	—	—	6.9
Barium sulfate	4.8	—	4.5	—	0.2	0.0
Aluminum sulfate	1.5	—	0.5	—	—	0.9
4,4-isopropylidenediphenol	43.9	—	34.8	—	—	9.1
Ethylene glycol monoethyl ether	25.2	0.8	—	10.3	—	14.1
Glyoxal	20.8	—	18.1	—	—	2.7
Cerosolob Acetate	15.5	0.9	—	—	14.6	—
1.3-dichloro-2-propanol	9.2	9.2	—	—	—	—
Silicon carbide	1.2	—	1.2	—	—	—
Tetrahydrofuran	92.5	48.4	—	30.0	0.4	13.7
Tetrafluoromethane	1.4	1.0	0.4	—	—	—
Hexafluoroethane	2.7	1.9	0.8	—	—	—
Lead solder	31.9	—	22.1	—	0.0	9.8

Data for substances amounting to at least one ton per year ("—" indicates no entry.)

Monitoring of Environmental Impact

Ricoh Industrie France, which is located in a scenic area, takes measures to conserve the environment and monitors the effects of its plant on the environment. The company tests the quality of underground water periodically and stores containers of used chemical substances in a specific area to prevent the risk of leakage of those substances during rain.

Machine used to wash parts

Closeup of plastic balls used to prevent evaporation

Ricoh Industrie France