

Pollution Prevention (Business Sites)

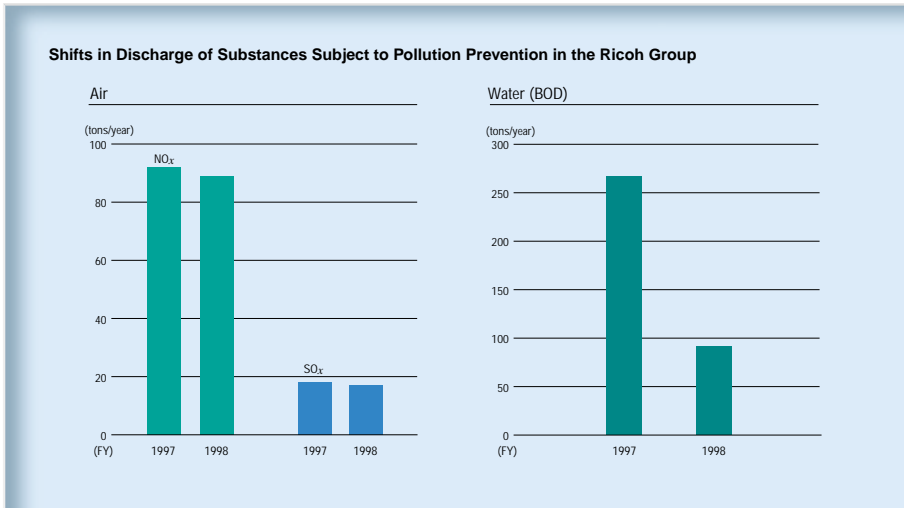
Goals and Progress

- Plans call for reducing the use of substances subject to PRTR (Pollutant Release and Transfer Register) at least 20%, emissions more than 50%, compared with those in 1997, and totally eliminate final landfill waste in all domestic and overseas business sites by fiscal 2001.
- ▶ Activities are underway to achieve those goals and fully establish the PRTR system throughout the Ricoh Group.
- Plans also call for completely eliminating the use of trichloroethylene and tetrachloroethylene by fiscal 2001.
- ▶ Some of our business sites have already completely eliminated the use of trichloroethylene and tetrachloroethylene.

◎ Concept of Pollution Prevention at Business Sites

OECD (Organization for Economic Cooperation and Development) member countries, such as the United States, Canada, England, the Netherlands, and Japan, have adopted PRTR. Under this system, the release of potentially harmful environmental pollutants into the air, water, and soil, and the transfer of waste are assessed by businesses, among others, and totaled and announced by a third party organization. In Japan, the Keidanren (Japan Federation of Economic Organizations) has started to implement PRTR. Ricoh has totaled the PRTR data for all its business sites in fiscal 1997 and reported the figure to Keidanren. Ricoh began spreading this system to all companies in the Ricoh Group in fiscal 1998 and promoting the reduction of the use and emission of PRTR substances in fiscal 1999.

Furthermore, we have been conducting surveys to improve the chlorine organic solvent problem since fiscal 1993. In July 1999, we completed the *Ricoh Group Soil Improvement Manual*, which includes self-imposed regulations that are stricter than other environmental quality standards as well as outlines to conducting surveys to improve the Ricoh Group's production and research and development facilities.



Zero Discharge of Plant Effluent into Public Water

The Ricoh Yashiro Plant worked together with Kajima Corporation and Ricoh Engineering to develop a closed system to process and reuse effluent produced at the plant, saving water and totally eliminating effluent. This innovative method, departing from the traditional approach of discharging wastewater after purification, is helping to better conserve the environment.

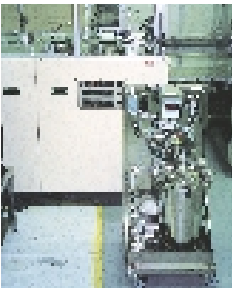
Total Elimination of Such Specified Organic Solvents as Chlorofluorocarbons

Ricoh stopped using all chlorofluorocarbons for washing such parts as photosensitive elements in December 1993, two years ahead of the deadline set by the Montreal Protocol. Tohoku Ricoh conducted an extensive review of the washing process of printed-circuit boards and switched to nonwashing and extensive water washing methods to completely stop the use of specified chlorofluorocarbons and trichloroethane. Ricoh Numazu, on the other hand, improved the washing process of photosensitive elements in 1996 and switched from using tetrachloroethylene to water-washing to eliminate the use of 20 tons of tetrachloroethylene per year. Tohoku Ricoh and

Ricoh Numazu have requested related parts manufacturers and processing companies to install the washing device they developed to help improve the washing method. The Disk Media Group of Ricoh Electronics reviewed the washing process of injection-molded disks and

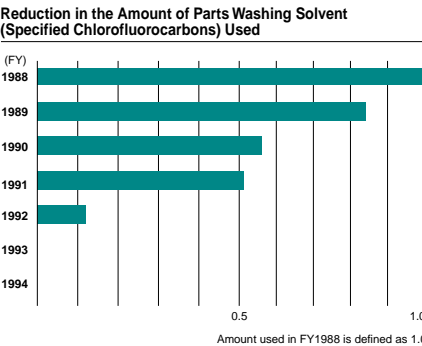


Washing device developed by Ricoh



Disk-washing device made by U.S.-based Ricoh Electronics

switched from isopropyl alcohol washing to water washing in 1998 to eliminate the use of 800 pounds of isopropyl alcohol per month.



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

Substances subject to PRTR (including exhaust pollutants)
Data for substances amounting to at least one ton per year. (A dash indicates no entry.)

Substance	FY	Amount	Emission in air	Discharge into public water	Amount consumed	Amount reduced	Amount transported (waste taken out of sites)	Amount recycled	Landfill (control type)
Chloroform	1997	1.31	0.97	—	0.02	—	0.32	—	—
	1998	1.62	0.99	—	0.02	—	0.61	—	—
Dichloromethane	1997	235.38	150.71	—	—	0.00	3.57	81.09	—
	1998	249.70	153.96	—	—	—	2.17	93.57	—
Tetrachloroethylene	1997	15.66	1.42	—	—	—	—	14.24	—
	1998	8.10	0.14	—	—	—	—	7.96	—
Trichloroethylene	1997	36.18	30.84	—	—	—	0.90	4.44	—
	1998	19.51	16.57	—	—	—	—	2.94	—
Nickel sulfate	1997	9.54	—	0.06	0.72	—	8.76	—	—
	1998	3.33	—	—	0.39	—	1.90	1.03	—
Zinc chloride	1997	30.69	—	—	30.50	—	0.18	—	—
	1998	46.78	—	—	44.48	—	0.56	1.75	—
Zinc oxide	1997	226.76	—	—	223.06	—	3.11	—	0.60
	1998	178.41	—	—	176.69	—	—	1.22	0.50
Xylene (mixed form)	1997	21.95	18.78	—	0.16	0.08	1.65	1.29	—
	1998	12.21	8.89	—	0.70	0.08	0.40	2.14	—
N, N - dimethylformamide	1997	42.68	1.68	—	—	—	—	41.00	—
	1998	37.68	1.40	—	—	—	—	36.27	—
Copper II oxide	1997	136.09	—	—	133.88	—	2.21	—	—
	1998	101.11	—	—	100.29	—	0.82	—	—
Toluene	1997	1,245.68	808.80	—	0.15	8.50	20.95	407.28	—
	1998	1,376.28	788.57	—	0.65	97.72	0.32	489.02	—
4, 4 - isopropylidenediphenyl	1997	58.27	—	—	48.29	—	—	9.98	—
	1998	63.77	—	—	50.36	—	—	13.41	—
Ethylene glycol	1997	29.75	0.80	—	—	15.19	13.76	—	—
Monoethyl ether	1998	23.42	0.78	—	—	14.92	7.54	0.18	—
Tetrahydrofuran	1997	12.92	5.02	—	0.01	—	0.09	7.80	—
	1998	39.42	0.76	—	0.97	11.55	2.54	23.60	—
Lead solder	1997	24.26	—	—	14.09	—	0.01	10.17	—
	1998	23.98	—	—	16.25	—	0.01	7.72	—

Legend: Survey on self-regulation of exhaust pollutants (Green), Survey on substances subject to PRTR (Blue)

FY1997 data was not available for Ricoh UK Products Ltd.

Solvent Gas Recovery Device and Disposal Device

Ricoh Fukui uses a solvent gas recovery device to recover and recycle organic solvent gas generated in the manufacturing process. Using a direct solvent gas burner, it also reduces the amount and density of emitted gas and carries out such appropriate treatment as deodorization.



Direct solvent gas burner

Elimination of Exhaust Pollutants Using Scrubbers

Chemical substances emitted into the air cause air pollution or soil contamination. Many production sites of the Ricoh Group, such as the Ricoh Yashiro Plant, absorb the chemical substances present in exhaust into water with pH control using scrubbers as well as recover and treat those substances in the water to prevent air pollution, soil contamination, and water contamination.

Monitoring of Environmental Impact

Ricoh Industrie France S.A., which is located in a scenic area, takes measures to conserve the environment and monitors the effects of their plant on the environment. Using four piezometers, 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.



Ricoh Industrie France