Control of Chemical Substances

Targets

- **Reduce use of chlorinated organic solvents in wash by at least 70% in fiscal 2003, with goal of elimination of these solvents by the end of fiscal 2006.**

Chemical substances have the potential to improve our lives in many ways, but at the same time can cause many serious problems such as ozone layer depletion, dioxin poisoning and the environmental endocrine effect — the spread of harmful elements throughout nature. In order to forestall this sort of damage, it is vital that the use of chemical substances be carefully controlled, that the amount of chemicals used is reduced, and that safer substances are substituted wherever possible.

Nikon is currently devising a management system that will enable us to effectively take all of these actions.

Substance Control Procedures

Nikon performs chemical substance control at every phase of the product life cycle, from purchase through use and disposal, in order to stop pollution caused by these substances. When first purchasing a new chemical substance, we obtain a Material Safety Data Sheet (MSDS) for the item, and carry out an assessment of the potential dangers of its use in the workplace. Based on the results of this assessment, our Environment, Safety and Hygienics section performs a review and confirmation of actions taken.

In addition to these measures, our Data Centre, located at the Ohi Plant, carries out intensive management of registration, updates and storage of MSDS.

Nikon's PRTR

The Pollutant Release and Transfer Register (PRTR) Law has been enacted in Japan as well, and daily management of chemical substances and diligent risk management are key factors in promoting business.

The "Nikon PRTR Guide" was released in March 2000, and management activity for the specified chemical substances is underway at each plant. This guide serves as a safety management standard which clearly outlines handling and disposal according to MSDS, for all product phases from procurement to use and disposal.

In March 2002, Nikon established a company system for legal notification, adding to and revising existing procedures for filling out such notifications.

In accordance with applicable laws, the fiscal 2002 report required reporting of quantities of five tons or more, with the only necessary notification being dichloromethane at our Sagamihara Plant.

Nikon PRTR Guide

PRTR Survey Results for fiscal 2002

Unit: kg/year

Facility	Substance No.	Substance name	Volume handled	Amount released			Amount transferred		Amount in on-site landfill	Amount removed for processing	Amount shipped in product
				Air	Public water	Soil	Sewage	Waste			
Ohi Plant	145	Dichloromethane	1,285	67	0	0	0	1,218	0	0	0
Yokohama Plant	145	Dichloromethane	4,791	4,702	0	0	0	89	0	0	0
Sagamihara Plant	145	Dichloromethane	5,560	4,815	0	0	0	745	0	0	0
Kumagaya Plant	227	Toluene	2,150	2,150	0	0	0	0	0	0	0
Total	145	Dichloromethane	11,636	9,584	0	0	0	2,052	0	0	0
	227	Toluene	2,150	2,150	0	0	0	0	0	0	0

* The above table includes data only for specified substances of which one or more tons are handled per year per facility. No such substances exist at the Mito Plant.

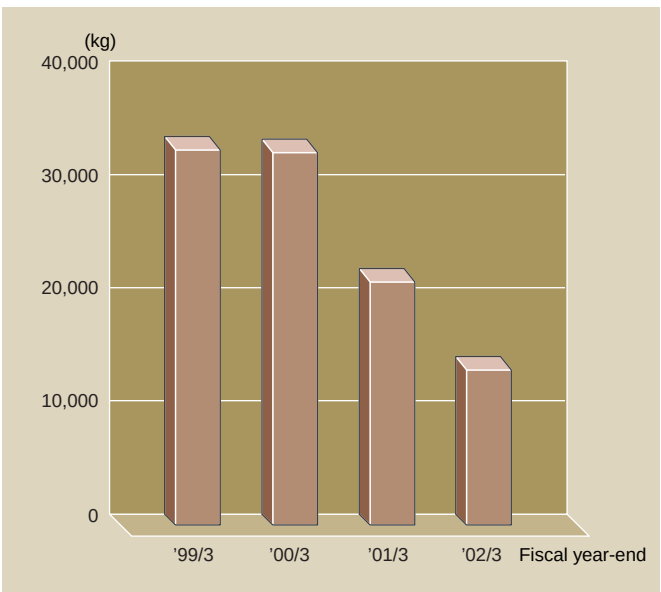
Reduction in Chemical Substances

The key question is how to best reduce the amount of chemical substances used. This is more than merely avoiding the risk of environmental pollution, and in fact signifies an improvement in Nikon's design and production systems. We are constantly working to reduce the volume of chemical substances used which have the most adverse effects on the environment, searching for alternatives, and making every effort to achieve zero chemical pollution.

Efforts to eliminate chlorinated organic solvents

We have established a target for total elimination of chlorinated organic solvents in wash applications of the end of fiscal 2006, and are now switching over to hydrocarbon wash agents and similar substances that have minimal effect on the environment.

The graph at right shows amounts used since fiscal 1999. The amount used in fiscal 2002 was 61% less than in fiscal 1999.



Prevention of Pollution and Protection of Air and Water

To help preserve air and water quality, Nikon not only observes applicable laws and regulations, but has also established its own independent plant standards for management.

Each plant regularly measures pollutants released into the air and water, and inspects equipment such as boilers and wastewater processing systems periodically to ensure safety.

Air and Water Quality Environmental Data for Fiscal 2002

Ohi Plant

Nishi-Ohi, Shinagawa-ku, Tokyo

Air (Air Pollution Control Law, Metropolitan Regulations)

Unit: Dust: g/Nm^3, NOx (nitrous oxides): ppm

Item		Regulatory standard	Plant standard	Actual (max.)
Boiler	Dust	0.15	0.12	0.002
	NOx	45	45	44

*1 Occurred June 2001 (exceeded established standard)
Cause: Acetic acid from laboratory insufficiently neutralized
Corrective action: Task cancelled

Water Quality (Sewerage Law, Metropolitan Regulations)

Unit: mg/l, except for pH

	Item	Regulatory standard	Plant standard	Actual (max.)
Living environment	pH	5.8-8.6	5.9-8.5	5.6-8.0 *1
	BOD	300.0	240.0	67.6
	SS	300.0	240.0	195.8
	n-hexane (animal/vegetable)	30.0	24.0	17.5
	Iodine demand	220.0	176.0	48.3
	Copper	3.0	2.4	<0.2
	Zinc	5.0	4.0	2.9
	Soluble iron	10.0	8.0	3.2
	Total chrome	2.0	1.6	<0.05
	Fluorine	15.0	12.0	2.0
	Nitrogen	120.0	96.0	76.1
	Phosphorous	16.0	12.8	1.45
Health	Cyanide	1.0	0.95	0.1
	Lead	0.1	0.08	0.04
	Hexavalent chrome	0.5	0.47	0.0
	Trichloroethylene	0.3	0.28	0.00
	Dichloromethane	0.2	0.16	0.01

Yokohama Plant

Nagaodai-cho, Sakae-ku, Yokohama, Kanagawa

Air (Air Pollution Control Law, Prefectural Regulations)

Unit: NOx (nitrous oxides): ppm

Item		Regulatory standard	Plant standard	Actual (max.)
Boiler	NOx	65	60	38
		65	60	35
		65	60	34
		46	42	24
		46	42	41
		46	42	24

*1 Occurred October 2001 (exceeded regulatory standard)
Cause: Water used to wash out the temperature-controlled oil system was accidentally released into the plant's general waste system.
Corrective action: Water drained from storage tank followed by complete wash, and company personnel trained in processing of oil-bearing wastes

Water Quality (Sewerage Law, Prefectural Regulations, City Regulations)

Unit: mg/l, except for pH

	Item	Regulatory standard	Plant standard	Actual (max.)
Living environment	pH	5.0-9.0	5.5-8.5	6.6-7.6
	BOD	600.0	540.0	0.4
	SS	600.0	540.0	0.4
	n-hexane (mineral)	5.0	4.5	10.0*1
	Iodine demand	220.0	200.0	25.4
	Copper	1.0	0.9	0.0
	Zinc	1.0	0.9	0.0
	Soluble iron	3.0	2.7	0.0
	Soluble manganese	1.0	0.9	0.0
	Total chrome	2.0	1.0	0.0
	Nickel	1.0	0.9	0.0
	Fluorine	8.0	7.0	0.6
	Boron	10.0	8.0	0.1
Health	Lead	0.1	0.1	0.02
	Arsenic	0.1	0.1	0.00
	Hexavalent chrome	0.5	0.4	0.00
	Trichloroethylene	0.3	0.2	0.00
	Tetrachloroethylene	0.1	0.1	0.00
	Dichloromethane	0.2	0.1	0.01

* For explanations of terms such as ppm and pH, see glossary on page 22.

Sagamihara Plant

Asamizodai, Sagamihara, Kanagawa

Air (Air Pollution Control Law, Prefectural Regulations)

Unit: Dust: g/Nm³, NOx (nitrous oxides): ppm

Item		Regulatory standard	Plant standard	Actual (max.)
Boiler	Dust	0.15	0.1	0.001
		0.15	0.1	0.001
		0.15	0.1	0.0011
		0.15	0.1	0.0018
		0.15	0.1	0.0011
		0.15	0.1	0.0032
		0.15	0.1	0.0017
		0.15	0.1	0.005
	NOx	105	100	85
		105	100	98
		105	100	80
		105	100	90
		105	100	94
		105	100	8
		105	100	8
		105	100	5

Water Quality (Sewerage Law, Prefectural Regulations)

Unit: mg/l, except for pH

Item		Regulatory standard	Plant standard	Actual (max.)
Living environment	pH	5.7-8.7	6.0-8.0	6.4-7.4
	BOD	300.0	60.0	13
	SS	300.0	90.0	<10
	Zinc	3.0	0.5	0.03
	Fluorine	12.0	10.0	4.6
	Boron	10.0	5.0	2.29
Health	Lead	0.1	0.08	0.04
	Arsenic	0.1	0.05	<0.01
	Dichloromethane	0.2	0.1	0.014

Kumagaya Plant

Oaza-miizugahara, Kumagaya, Saitama

Air (Air Pollution Control Law, Prefectural Regulations)

Unit: Dust: g/Nm³, NOx (nitrous oxides): ppm

Item		Regulatory standard	Plant standard	Actual (max.)
Boiler	Dust	0.1	0.05	0.003
		0.1	0.05	0.003
		0.1	0.05	0.001
		0.1	0.05	0.003
		0.1	0.05	0.001
		0.1	0.05	0.003
		0.1	0.05	0.001
		0.1	0.05	0.002
		0.1	0.05	0.002
		0.1	0.05	0.002
		0.1	0.05	0.001
	NOx	150	100	46
		150	100	46
		150	100	61
		150	100	94
		150	100	94
		150	100	83
		150	100	87
		150	100	31
		150	100	43
		150	100	61
		150	100	14

Water Quality (Sewerage Law, Prefectural Regulations)

Unit: mg/l, except for pH

Item		Regulatory standard	Plant standard	Actual (max.)
Living environment	pH	5.1-8.9	5.9-8.2	6.8-7.6
	BOD	600.0	450.0	29.0
	SS	600.0	150.0	35.0
	n-hexane (mineral)	5.0	4.0	<1.0
	n-hexane (animal/vegetable)	30.0	30.0	1.0
	Iodine demand	220.0	220.0	73.0
	Copper	3.0	0.5	<0.2
	Zinc	5.0	0.5	<0.05
	Soluble iron	10.0	9.0	<0.3
	Total chrome	2.0	1.7	<0.2
	Fluorine	15.0	2.5	<0.5
	Nitrogen	240.0	60.0	27.0
	Phosphorous	32.0	20.0	10.0
Health	Cyanide	1.0	0.3	<0.1
	Lead	0.1	0.1	<0.01
	Hexavalent chrome	0.5	0.1	<0.05

Mito Plant

Motoishikawa-cho, Mito, Ibaraki

Air (Air Pollution Control Law, Prefectural Regulations)

Unit: Dust: g/Nm³, NOx (nitrous oxides): ppm, SOx (sulfurous oxides): Nm³/h

Item		Regulatory standard	Plant standard	Actual (max.)
Boiler	Dust	0.3	0.27	0.014
		0.3	0.27	0.012
		0.3	0.27	0.011
	NOx	180	162	86
		180	162	87
		180	162	84
	SOx	3.25	0.67	0.036
		3.25	0.67	0.037
		3.25	0.67	0.13

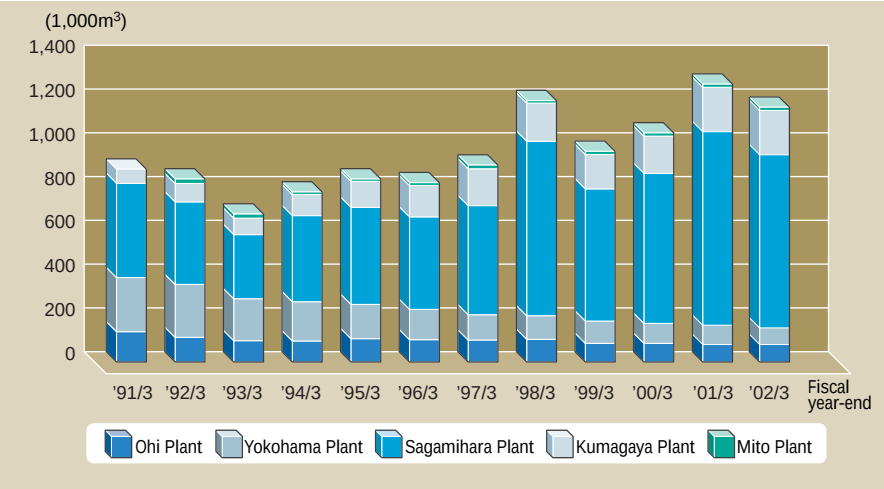
Water Quality (Water Pollution Control Law, Prefectural Regulations)

Unit: mg/l, except for pH and E. coli (colonies/ml)

Item		Regulatory standard	Plant standard	Actual (max.)
Living environment	pH	5.8-8.6	6.0-8.2	6.8-7.6
	BOD	20.0	20.0	19.0
	SS	30.0	30.0	13.0
	n-hexane (animal/vegetable)	10.0	10.0	<1
	E. coli (daily average)	3,000.0	2,700.0	132
	Nitrogen	60.0	60.0	59.9
	Phosphorous	8.0	8.0	7.09
Health	Trichloroethylene	0.3	0.3	<0.001

Water Usage

Plants engaged in manufacturing continuously expand and evolve structurally, but since the introduction of the "Environmental Management System" in fiscal 1999, efforts have been made to promote reuse of process waste water, and reduce water usage by involving all employees in water-saving activities.



Glossary

ppm: Parts per million

pH: Hydrogen ion concentration
Indicates the acidity or alkalinity of a substance, where a solution of pH 0 to 7 is acid, pH of 7 is neutral, and a pH over 7 is alkaline. A change of one pH number indicates a 10-fold change in the concentration of hydrogen ions.

BOD: Biochemical oxygen demand
The amount of oxygen required for microorganisms to oxidise and consume organic pollutants in water. Used to gauge the degree of pollution of rivers.

SS: Suspended solids
Also referred to as substances that cause water clouding, they include small particles, plankton, organism carcasses and detritus, excretions and other organic materials, as well as sand, mud and inorganics and a range of manmade pollutants.

n-hexane (mineral or animal/vegetable): Normal hexane mass
Used to measure the total content of oils and hydrocarbons in waste water, it indicates the amount of materials extracted to normal hexane and which do not volatilise at about 100°C. Covers animal and vegetable oils, fatty acids, petroleum-based hydrocarbons, wax and grease.

Iodine demand
The amount of iodine used by the reducing substances (sulphide, etc.) in waste water during iodine oxidation. It is an index of the presence of the reducing substances in waste water.