# Environmental Activities of Fiscal 2001

## PRTR Initiatives

It is said that more than 100,000 types chemical substances are used for various applications. These chemicals support our abundant lifestyles and provide us with convenience. Pollutant Release and Transfer Register (PRTR) is a system by which a business that uses chemicals that could possible affect the health of human beings or the ecosystem must tabulate the quantity of such chemicals discharged or transferred and report it to the government. Businesses are obligated by the PRTR Law to carry this out under certain conditions. Since establishing Nitto Denko's special regulation concerning control of chemical substances in 1995, we have worked on proper control of chemical substances and have applied the regulation since 1997 even before the PRTR Law went into effect.

## PRTR tabulation results

In fiscal 2001, we used 65 of the substances regulated by the PRTR Law, and have worked on reducing them by controlling discharge of such substances. Nitto Denko is building its own original PRTR database system that can automatically calculate quantity of substances discharged and transferred from the amount purchased for each process.

## Voluntary chemical substance management guidelines

To accelerate reduction of chemical substances containing substances regulated by the PRTR Law, Nitto Denko established the regulation concerning control of chemical substances in August 2001. Those of the chemical substances generally used that could possibly have an impact on the environment, safety/hygiene, or disaster prevention are classified into 3 classes:prohibition, reduction or control according to seriousness of environmental impact and legal regulations. Proper internal control is sustained for these. Construction of a database for each assessment class was completed in fiscal 2001. Since fiscal 2002, substantial management for reducing quantity of chemical substances used has been assigned a priority ranking and promoted. Special attention is given to reduction of dichloromethane, which was added to the list of regulated substances by revision of the "Safety Guidelines" of the Ministry of Welfare and Labor.

Substances regulated by the PRTR Law discharged in quantity of 1 t or more in fiscal 2001
(quantity discharged by each plant [t/year])

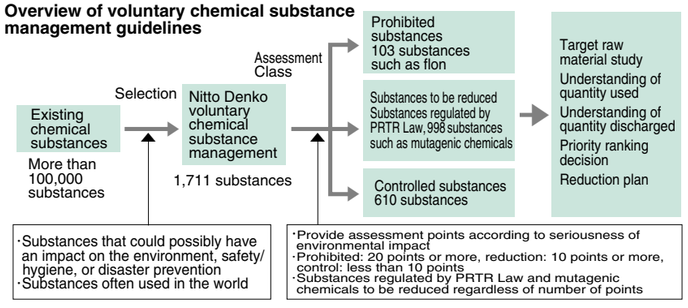
| Plant | 1998 | 1999 | 2000 | 2001 |
|---|---|---|---|---|
| | Substance name Toluene | | | |
| Tohoku plant | 201 | 206 | 196 | 170 |
| Kanto plant | 87 | 178 | 166 | 113 |
| Toyohashi plant | 4,674 | 3,790 | 2,824 | 1,723 |
| Kameyama plant | 7 | 5 | 5 | 5 |
| Shiga plant | 0 | 0 | 0 | 0 |
| Onomichi plant | 113 | 33 | 45 | 29 |
| Kyusyu plant | 0 | 0 | 0 | 0 |
| TOTAL | 5,082 | 4,212 | 3,236 | 2,040 |
| | Substance name Dichloromenthane (Methylene chlorid) | | | |
| Tohoku plant | 0 | 0 | 0 | 0 |
| Kanto plant | 0 | 0 | 0 | 0 |
| Toyohashi plant | 417 | 329 | 178 | 72 |
| Kameyama plant | 1 | 0 | 0 | 0 |
| Shiga plant | 0 | 0 | 0 | 0 |
| Onomichi plant | 0 | 0 | 0 | 0 |
| Kyusyu plant | 0 | 0 | 0 | 0 |
| TOTAL | 418 | 329 | 178 | 72 |
| | Substance name Xylem | | | |
| Tohoku plant | 0 | 0 | 0 | 0 |
| Kanto plant | 27 | 27 | 25 | 24 |
| Toyohashi plant | 4 | 4 | 2 | 2 |
| Kameyama plant | 5 | 0 | 0 | 0 |
| Shiga plant | 0 | 0 | 0 | 0 |
| Onomichi plant | 0 | 0 | 0 | 0 |
| Kyusyu plant | 0 | 0 | 0 | 0 |
| TOTAL | 36 | 31 | 27 | 26 |

| Plant | 1998 | 1999 | 2000 | 2001 |
|---|---|---|---|---|
| | Substance name Dichloropentafluoropropane (HCFC-225) | | | |
| Tohoku plant | – | 0 | 0 | 0 |
| Kanto plant | – | 0 | 0 | 0 |
| Toyohashi plant | – | 0 | 0 | 0 |
| Kameyama plant | – | 22 | 19 | 14 |
| Shiga plant | – | 0 | 0 | 0 |
| Onomichi plant | – | 0 | 0 | 0 |
| Kyusyu plant | – | 0 | 0 | 0 |
| TOTAL | – | 22 | 19 | 14 |
| | Substance name Bis (2-ethylhexyl) phthalate (DOP) | | | |
| Tohoku plant | 0 | 0 | 0 | 0 |
| Kanto plant | 0 | 0 | 0 | 0 |
| Toyohashi plant | 4 | 3 | 5 | 4 |
| Kameyama plant | 0 | 0 | 0 | 0 |
| Shiga plant | 0 | 0 | 0 | 0 |
| Onomichi plant | 0 | 0 | 0 | 0 |
| Kyusyu plant | 0 | 0 | 0 | 0 |
| TOTAL | 4 | 3 | 5 | 4 |
| | Substance name Polyoxyethylene nonylphenyl ether | | | |
| Tohoku plant | – | 0 | 0 | 0 |
| Kanto plant | – | 0 | 3 | 9 |
| Toyohashi plant | – | 0 | 0 | 0 |
| Kameyama plant | – | 0 | 0 | 0 |
| Shiga plant | – | 0 | 0 | 0 |
| Onomichi plant | – | 0 | 0 | 0 |
| Kyusyu plant | – | 0 | 0 | 0 |
| TOTAL | – | 0 | 3 | 9 |

| Plant | 1998 | 1999 | 2000 | 2001 |
|---|---|---|---|---|
| | Substance name di-n-butyl phthalate (DBP) | | | |
| Tohoku plant | 0 | 0 | 0 | 0 |
| Kanto plant | 0 | 0 | 0 | 0 |
| Toyohashi plant | 3 | 3 | 3 | 2 |
| Kameyama plant | 0 | 0 | 0 | 0 |
| Shiga plant | 0 | 0 | 0 | 0 |
| Onomichi plant | 0 | 0 | 0 | 0 |
| Kyusyu plant | 0 | 0 | 0 | 0 |
| TOTAL | 3 | 3 | 3 | 2 |
| | Substance name Ethylene glycol Monomethyl ether (2-methoxy ethanol) | | | |
| Tohoku plant | – | 0 | 0 | 0 |
| Kanto plant | – | 0 | 0 | 0 |
| Toyohashi plant | – | 0 | 0 | 0 |
| Kameyama plant | – | 2 | 2 | 0 |
| Shiga plant | – | 0 | 0 | 0 |
| Onomichi plant | – | 0 | 0 | 0 |
| Kyusyu plant | – | 0 | 0 | 0 |
| TOTAL | – | 2 | 2 | 0 |
| | Substance name Acrylic acid | | | |
| Tohoku plant | 0 | 0 | 0 | 0 |
| Kanto plant | 0 | 0 | 0 | 0 |
| Toyohashi plant | 3 | 4 | 1 | 1 |
| Kameyama plant | 0 | 0 | 0 | 0 |
| Shiga plant | 0 | 0 | 0 | 0 |
| Onomichi plant | 0 | 0 | 0 | 0 |
| Kyusyu plant | 0 | 0 | 0 | 0 |
| TOTAL | 3 | 4 | 1 | 1 |

–: Not measured because not applicable.

**Overview of voluntary chemical substance management guidelines**




**Voluntary management method by management class**

| Management class | Management class | Management class |
|---|---|---|
| I. Prohibited substances | II. Substances to be reduced | III. Substances to be controlled |
| Management details | Management details | Management details |
| New use prohibited (analysis and experiments not included)<br>Target fiscal year for banning substances currently being used to be decided and substances banned. | Amount used, amount discharged and amount used per product unit to be reduced.Reduction however takes amount used, amount discharged and other factors into account. Priority ranking, target fiscal year and amount to be reduced are decided and reduction is executed.<br>Get a good understanding of amount used and approximate amount discharged.Reduction for substances regulated by PRTR Law is however executed by degree of accuracy decided by law. | Get a good understanding of amount used and approximate amount discharged.<br><br>Substances specified by law are based on the law. If the plant determines it to be necessary, the plant's management class is decided with priority given to management class. |



## Maintenance and improvement of work environment

The Nitto Denko Group does its best to maintain and improve the work environment with setting own solvents concentration tagets. The target values are 1/10 or less of the values which were established by the Ministry of Welfare and Labor in the working place.

Voluntary management value of work environment concentration (copied)

| Substance name | Ministry of Welfare and Labor management concentration | Voluntary management value |
|---|---|---|
| Xylene | 100ppm | 10ppm |
| Ethyl acetate | 400ppm | 40ppm |
| Dichloromethane | 100ppm | 10ppm |
| Toluene | 100ppm | 10ppm |

## Reduction of toluene emission into the atmosphere

Toluene, a substance regulated by the PRTR Law, is used to dissolve various substances. Produced in mass quantities as a byproduct of oil refining, it is easily obtained and widely used as a solvent. Nitto Denko also uses toluene in the manufacturing process of adhesive tape. Toluene and ethyl acetate*account for about 85% of the organic solvents discharged. Nitto Denko recognizes reduction of discharge of these substances to be a theme of great importance and is working on reduction of those substances.

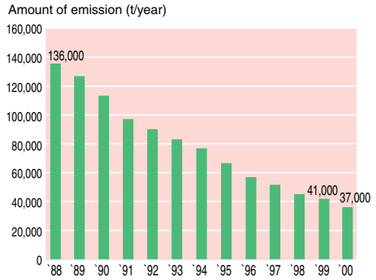
*Not regulated by PRTR Law

## Reduction of toluene emission from Toyohashi plant

The Toyohashi plant, which produces a lot of adhesive tape, released 3,790 tons of toluene into the atmosphere in 1999. An extremely large figure for a single plant, it is the equivalent of approx. 5.8%* of all plants in the country for the year according to data collected by Keidanren. The amount of toluene discharged by the Toyohashi plant was large even compared to the data of America where the amount of toluene released into the atmosphere was effectively reduced by a similar system to PRTR that went into effect in 1986. Based on this awareness, concerning reduction of amount of organic solvents discharged, Nitto Denko has done its best to reduce amount of toluene emission from the Toyohashi plant in accordance with Voluntary Plan 3. In fiscal 2001, it was reduced to 1,723 tons.

*Whereas amount of toluene emission according to Keidanren study was 65,609 tons (estimated cover ratio of 84%), emission from the Toyohashi plant in fiscal 1999 was 3,790 tons.
*Toxic Release Inventory (TRI)

U.S. national toluene atmospheric emission transition (reference)



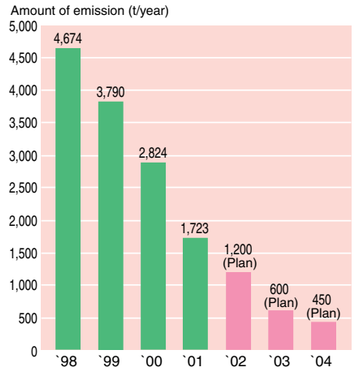

## Toluene emission control at Toyohashi plant

Total emission of organic solvents such as toluene is not regulated by law in Japan, but there are cases where emission outlet concentration or at boundary line concentration are regulated by prefectural ordinance. In Aichi Prefecture where the Toyohashi plant is located, emission outlet concentration is restricted to 100 ppm and boundary line concentration to 60 ppm, which is strict even by national standards. We voluntarily control emission outlet concentration to 80 ppm, which is even lower than that. This is strictly monitored and the voluntary control value was never exceeded in 2001.

## Toyohashi plant toluene emission reduction plan

As was previously stated, the amount of toluene released into the atmosphere at the Toyohashi plant has gradually been reduced, but is not yet to a satisfactory level. Our plan calls for reducing this amount to no more than 450 tons in fiscal 2004 by updating and repairing the solvent recovery unit, installing a deodorizing furnace, closing the manufacturing equipment and vigorously promoting development of solvent-free adhesive tape. The equipment investment pan has already been approved and work has begun.

Toyohashi plant toluene emission reduction plan




### Environmental impact of toluene

Toluene is easily broken down inside organisms and does not tend to become concentrated. When emitted into the atmosphere, half is decomposed by sunlight and substances in the air* in 4 days in the summer and several months in the winter. It is thought that toluene itself however can harm health by sick house syndrome and can effect the environment by decomposing product material. The main effects are given in the following flowchart.

*Primarily hydroxyl group radicals, etc.