Promotion of Green Factories

Eco-friendly manufacturing in factories with comprehensive environmental protection features and activities

The Green Factory Concept (eco-friendly factories)

To reduce the environmental burden imposed by the use of raw material and energy resources in our factories and business activities, we are pursuing policies designed to reduce the use of energy and materials and the volume of waste generation and chemical emissions. Green Process activities and Green Facility activities are the practical means by which we implement these policies.

Green Process Activities

Green Process activities are intended to reduce manufacturing costs and, after calculating a "Cost Green" (CG)* index for each product line (based on the amount of materials it requires, the volume of chemical substances it uses, and the energy it consumes, etc.), to lower these indices and the corresponding environmental burdens continually.

The CG index is used to assign priorities for Green Process activitites within the Group and to set quantitative targets, devising and implementing plans to reduce eco-burdens and costs. If a target is not achieved, the reasons are thoroughly analyzed, and the results fully embodied in subsequent targets.

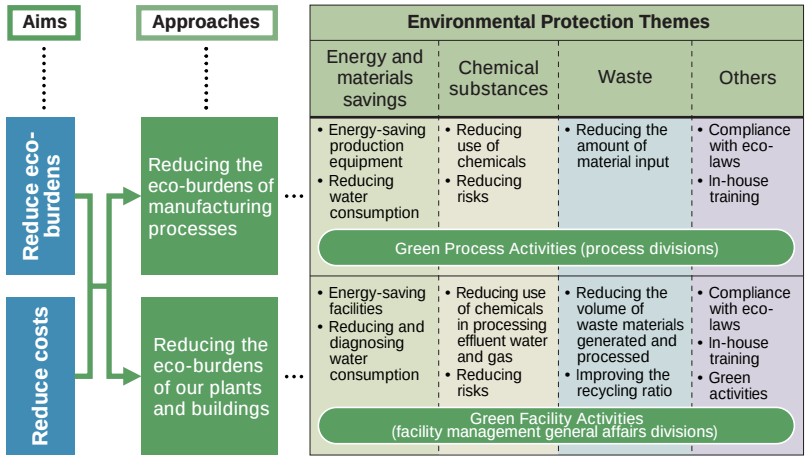
* CG index: The product of input volume used per product, the cost, and the environmental impact (on a scale from 1 to 10).

Green Facility Activities

Green Facility activities are focused on stabilizing factory operation and reducing the enviromental burden, ensuring complete compliance with environmental legislation, predicting environmental risks, saving energy, water, chemicals and other material resources, and improving the production infrastructure (including production equipment).

In the support departments, regularly established objectives lead to activities to reduce the eco-burden by saving energy and particularly by reducing CO_2, the results of these activities are evaluated, and further improvement measures proposed in a repeated PDCA cycle (Plan, Do, Check, Act).

The Green Factory Concept



Green Process Activities

Complete Replacement and Non-use of Perfluoroethane Reduces CG Index by 91.8% (Fujitsu Isotec)

Fujitsu Isotec is a major producer of PCs, IA servers, PC workstations and printers. As part of its Green Process activities, it took up the challenge of finding a replacement for perfluoroethane, a substance that causes global warming, carefully reviewing its use in cleaning print heads. This led to adopting tertiary hydrocarbons for the drying process that follows the print-head washing process.

By adopting this new drying process, the company was able to completely dispense with the use of perchloroethane (100% reduction) and reduce the unit washing cost. This, along with recycling the used washing liquid, helped to reduce the CG index by 91.8%, and washing costs were cut by 83.7%.

On-site Disaster-prevention Inspections

We predict the effects of natural disasters such as earthquakes and typhoons upon production facilities and the potential for leakage of harmful substances beyond the factory site, and we regularly carry out inspections to guard against such environmental risks.

Inspecting chemical tank protection (protecting against leakage)

Items Covered

- Replacement of chemical storage tanks (before they become too old)
- The double wall of liquid effluent tanks (as a backup to prevent leakage)
- Confirmation of proper inspection procedures for leak detectors and level alarms
- Organizational and procedural measures to deal with emergencies when they arise (simulating various scenarios), etc.

Coping with Environmental Risks

To guard against risks, and to prevent damage to the environment should an accident happen, environmental risk management, including risk assessments, is carried out in accordance with the applicable controls (see P14).

Fujitsu Group Environmental Protection Program (Stage IV) Target

To reduce, by the end of fiscal 2006, the discharge of chemical substances that are subject to the Pollutant Release and Transfer Register (PRTR) by 15% compared to the fiscal 2001 discharge levels.

Fiscal 2004 Performance

Emissions of specified chemical substances were 52.1 tons, a decline of 48.1% compared with fiscal 2001.

Reducing the Amount of Chemicals Discharged

Discharge Reduction Policy

At sites where large amounts of chemical substances are handled — Fujitsu's four factories and six consolidated manufacturing subsidiaries in Japan plus two consolidated manufacturing subsidiaries overseas — we are working to achieve planned reductions of in 354 Class 1 PRTR Law substances.

In order to achieve the targets at each of these locations, working groups meet twice a year to check the actual situation and investigate any problems. To reduce the amount of these chemicals, we are carefully managing facilities processing effluent gases and liquids and Green Process activities are used to properly manage the use of these substances and reduce the volume discharged.

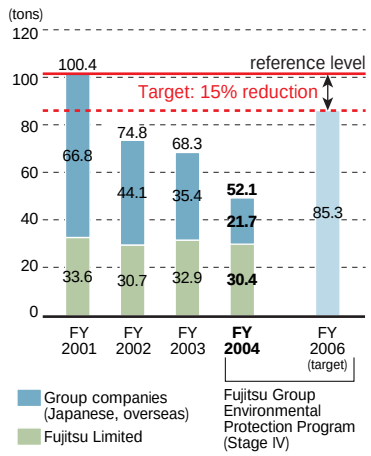
Fiscal 2004 Performance

Of the 85.3-ton target for the amount of PRTR Law chemicals to be discharged annually (for fiscal 2004 through 2006), 33.2 tons were eliminated in fiscal 2004 as a result of the deconsolidation of two major companies, a review of production activities, the transfer of production, and activities at each of the sites. The total amount of such chemicals discharged* by the entire Group in fiscal 2004 was 52.1 tons, 48.3 tons (48.2%) less than the 100.4 tons in fiscal 2001. Fujitsu Limited itself discharged 30.4 tons, which is 9.5% less than in fiscal 2001.

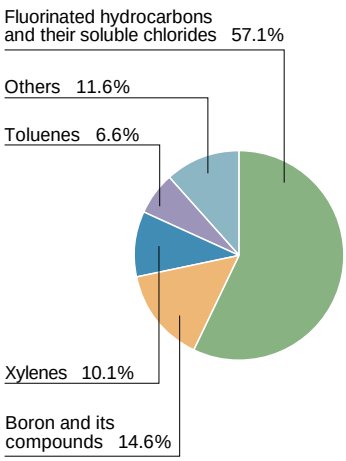
Besides complying with the PRTR Law requirements for reporting to the authorities data on any of 354 Class 1-designated chemicals with annual usage/processing amounts of one ton or more, we compile data on these substances based on a 0.1-ton minimum.The total usage and discharge of PRTR Law chemicals is displayed on our website.

http://www.fujitsu.com/about/environment/

PRTR Law Chemical Discharge Amounts



Proportions of Chemicals Discharged



Main Factors in the Fiscal 2004 Decrease

- The decrease from deconsolidation of two companies, FDK Corp. and Eudyna Devices Inc.
- Improved fluorination in wastewater treatment at the Mie Plant.
- Changes in the manufacturing process that reduced the amount of xylenes discharged at the Mie Plant.

* Calculation of the Group's total chemical discharge amounts: Values are calculated by multiplying the total volume of effluent (nickel, manganese and other chemical compounds) or atmospheric emissions (xylenes, toluenes, and other chemicals) by the relevant substance concentrations measured at the points of discharge from the site. Values for xylenes, toluenes and other chemicals may also be based on the amounts purchased and used.
Numerical values in the text and graphs have been rounded to the second decimal place. Totals have also been slightly adjusted for consistency.

Integrated Control of Information on Chemicals

Fujitsu Limited introduced a system to control the usage of chemicals in fiscal 2000, and has been performing integrated management of them ever since. We are now enhancing the system's functions so that operation can be extended to the Group's manufacturing subsidiaries.

Promotion of Green Factories

Fujitsu Group Environmental Protection Program (Stage IV) Target

To reduce the amount of waste generation by 3% compared to the actual amount in fiscal 2003 by the end of fiscal 2006.

Fiscal 2004 Performance

The amount of waste generated was 50,120 tons, a decline of 1.5% compared with fiscal 2003.

Reducing the Amount of Waste Generated*

Policy for Reduction of Waste Generated by Sites

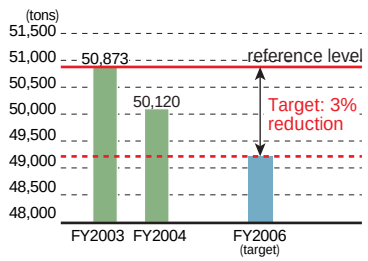
In working towards a recycling society, we have adopted a basic 3R policy (Reduce, Reuse and Recycle), and are encouraging all employees to separate wastes into different categories.

* Waste generation reduction
Definition: Reduction of waste generated by sites
Targeted waste: All (excluding those with monetary value)

Fiscal 2004 Performance

The amount of waste generated by our sites in fiscal 2004 was 50,120 tons, 1.5% less than in fiscal 2003. Activities to reduce the amount of waste generated are proceeding smoothly. The main factors in the reduction were the improvements in the separation of paper and metallic waste that allowed monetary value to be assigned to them, as well as application of value to organic alkalis.

Amounts of Waste Generated



Progress towards Zero Waste Emissions* at Group Companies in Japan

We are actively promoting zero emissions, focusing first at our domestic Group companies. For example, we have introduced systems for treating sewage using microorganisms and revised operational control methods aimed at reducing sewage emissions to zero. Thanks to these efforts along with information sharing and the rigorous separation and re-use of wastes, many sites and Group companies have already achieved zero emissions. However, in regions with particularly strict regulation of water-quality standards or where there are structural issues with the sewage treatment equipment, some sites have not yet achieved zero emissions.

Going forward, we will investigate new technologies, and strive to further reduce the generation of waste and achieve zero emissions.

The most effective methods of re-using wastes are as follows.

- Sludge: As a raw material for cement, copper recovery.
- Plastic wastes: As a raw material for plastic or solid fuel.
- Acid and alkali wastes: As neutralizers.
- Oily wastes: As recycled oil in combustion improvers.
- Waste paper: As recycled paper, thermal recycling.
- Metallic wastes: As raw materials for smelting.
- Animal and vegetable wastes (canteen leavings): As fertilizer.

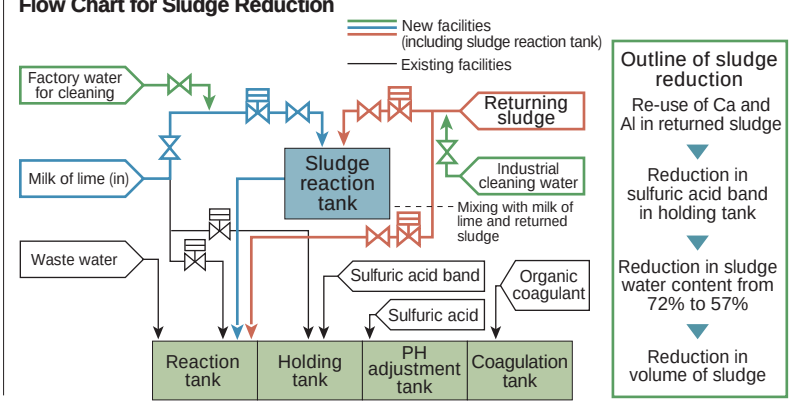
* Zero waste emissions
Definition: Achieving 100% waste utilization, with none going to landfills or simple incineration.
Targeted waste: Sludge, acids and alkalis, plastics, oil, metals, glass, wood, paper, animal and vegetable wastes (canteen leavings), sewage.

An Example from Fiscal 2004

Working to Reduce Fluorinated Sludge (Iwate Plant)

At our Iwate Plant, 54% of wastes is wastewater. In order to reduce the amount of sludge containing fluorine generated in water treatment, previously the sludge returned from the milk-of-lime settling tanks was injected into separate reaction tanks, but now the sludge is mixed into a sludge reaction tank and the facilities have been replaced with others that extract the Ca and Al from the returned sludge. In this way, the sulfuric acid band required in the holding tanks is reduced, and the water content of the sludge is reduced from 72% to 57% and its volume reduced.

Flow Chart for Sludge Reduction



Operations begun at our next-generation LSI device Green Factory using the latest eco-friendly equipment

— Environmental measures adopted for new facility at Mie Plant

In April 2005, at the 307,000m^2 site of the Mie Plant (in Kuwana City, Mie Prefecture), a new facility was completed for the mass production of LSI logic devices on large-diameter 300mm wafers using 90nm and next-generation 65nm design rules.

The new factory, with 12,000m^2 of clean room area, is our latest Green Factory, actively committed to preventing global warming, reducing the discharge of waste and chemical substances, and reducing a wide variety of environmental burdens.

The new wing of the Mie Plant

Environmental Measures

To Prevent Global Warming

- Eliminated use of fuel oil
  There are no boilers using fuel oil. They have been replaced with small boilers using natural gas.
- Equipment installed to remove PFCs
  This reduces the emission of substances other than CO_2 implicated in global warming.
- NAS battery system
  We are using NAS (sodium-sulfur) batteries to store electrical energy for nighttime use and to smooth the power load.
- Localized clean rooms
  These help to reduce air-conditioning energy requirements.
- Solar cells and wind-power generators
  These are used for car park lighting.

Small boilers burning natural gas

NAS batteries

PFC removal equipment

Solar and wind generators

To Reduce Waste Discharge

- Zero emissions from the start of operations
  Spent hydrofluoric and sulfuric acid are recovered and recycled.
- Reducing the amount of waste generated
  Equipment to compact alkali has been introduced.

Alkali compaction equipment

To Reduce Chemical Discharge

- Reductions in the volumes of nitrogen and phosphorous discharged
  Introduced method using microorganisms for wastewater treatment.
- Reductions in the volume of fluorine discharged

Secondary process device for fluorine

Aseismic Measures

The World's First Hybrid Seismic Isolation Structure

In addition to the measures to reduce environmental burdens, measures have also been taken to cope with earthquakes. The new facility uses three types of devices to isolate the building from earthquake tremors: rubber laminations, oil dampers, and sliding supports. These suppress normal vibrations and protect the production lines against earthquake tremors rated up to 6 (strong) on the Japanese scale.

The risks of earthquake-induced environmental pollution and other human disasters have likewise been minimized.

Seismic isolation device (rubber laminate support)

Seismic isolation device (rigid slider support)

Seismic isolation device (oil damper)