

The background of the cover is a photograph of a modern, multi-story glass building. In the foreground, there is a landscaped area with a stone-lined water feature, a paved walkway, and greenery. The sky is clear and blue.

# Environmental Report 2005



# Corporate Outline

Trade name: MABUCHI MOTOR CO., LTD.  
Established: January 18, 1954  
Field of Operations: Manufacture and sales of small electric motors  
Capital: 20,700 million yen (as of December 31, 2004)  
Employees: Headquarters: 1000  
Mabuchi Group: approximately 50,000 (as of December 31, 2004)

President: Shinji Kamei  
Address: Headquarters  
430 Matsuhidai, Matsudo-shi,  
Chiba-ken, 270-2280 Japan  
TEL: +81-47-710-1109

Technology Center: 280 Ryufukuji, Motono-son, Inba-gun,  
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TEL: +81-047-710-1222

## Data Collection Period/Scope of Mabuchi Motor Environmental Report 2005

- Data collection period: FY2004 (January 1, 2004 – December 31, 2004)
- Scope: Headquarters and overseas related companies
- \* Remarks: "The Mabuchi Group" is used in this Report as a collective term for the Headquarters and the following related overseas companies (as of the end of December 2004):
  - Hong Kong Mabuchi (including Guangdong Mabuchi)
  - Taiwan Mabuchi
  - Kaohsiung Mabuchi
  - Dalian Mabuchi
  - Malaysia Mabuchi
  - Jiangsu Mabuchi
  - Vietnam Mabuchi
- Activities covered: Environmental activities related to the manufacture and sales of motors and provision of services



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Note: The cover photo shows the biotope landscape constructed at the new Mabuchi Motor headquarters; the photo below shows the new Mabuchi Motor headquarters as viewed from the south when cherry blossoms were in full bloom.



# Message from the President

On my days off I sometimes ride my bicycle to a nearby park.

From time to time I put a little extra power into my pedaling and work up a sweat, but the pleasant breeze that blows past makes these rides all the more enjoyable. Occasions such as this come as a fresh reminder that opportunities to interact with nature bring me an enormous sense of peace.

Of course our natural environment provides us with far more than calm and comfort; indeed, the natural environment has an absolute influence on our very existence. This is particularly evident in the abnormal weather caused by global warming, which has a tremendous impact on human beings as well as on flora and fauna.

According to government reports, Japan's emissions of greenhouse gases in FY2003 totaled 1,339 million tons (CO<sub>2</sub> equivalent), a year-on-year increase of 0.7% and 8.3% higher than the level for the base year (1990) stipulated in the Kyoto Protocol. As Japan pledged in the Kyoto Protocol to reduce its CO<sub>2</sub> emissions by 6% from the 1990 level, the FY2003 figure indicates that a 14.3% (6% + 8.3%) reduction will have to be made by 2010. This is unquestionably a very difficult target, but meeting this target nevertheless remains an important issue.

Mabuchi Motor manufactures and sells small motors used across a broad range of products—automotive products, audio products, office automation equipment, home electric appliances, kitchen utensils, power tools, toys, etc.—and around the world. Given that our motors are utilized in such a diversity of ways and places, Mabuchi Motor must proactively endeavor to reduce CO<sub>2</sub> emissions and we have accordingly implemented numerous measures to that end. In the production and sale of small motors, we have pursued energy and resource conservation as far as possible by consolidating our bases and rationalizing production, thereby reducing CO<sub>2</sub> emissions. Mabuchi Motor remains committed to reducing future CO<sub>2</sub> emissions in every aspect of its operations.

Emissions of health-threatening hazardous substances also present a major environmental problem, and aggressively reducing emissions of these substances is essential to protecting the environment. Industry as a whole has undertaken efforts to reduce or abandon the use of hazardous substances in the products offered to consumers.

To ensure that the electric and electronic products (small motors) produced by Mabuchi Motor do not pollute the environment either while they are being used or after they have been discarded, Mabuchi Motor is working to remove hazardous substances (lead, cadmium, hexavalent chromium compounds, etc.) contained in parts and materials. We are also actively engaged in reducing the hazardous substances employed in the production of small motors. In addition, we make certain that our motors are compliant with EU directives such as EU-ELV and RoHS, regulations governing the use of these hazardous substances, and we have been dedicated ourselves to minimizing the environmental burden of our operations.

In this Report we have sought to convey in a readily understandable fashion Mabuchi Motor's efforts and accomplishments in reducing environmental burden in FY2004. We believe that acquainting the public with the environmental conservation approaches undertaken by the Mabuchi Group is critical to continual improvement of our environmental conservation activities.

We hope that you will take the time to read through this Report and offer us your candid opinions and impressions.

October 2005



**Shinji Kamei**

President and Representative Director  
Mabuchi Motor Co., Ltd.



**Mabuchi Motor expresses its environmental philosophy in its management philosophy and management guidelines, which are the starting point and, at the same time, the goal of its business activities.**

## **Management Philosophy**

### **Contributing to International Society and Ever-expanding Our Contribution**

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#### **Management Guideline-1**

Create superior and reasonably priced products. Our hope is to help build a more satisfying and comfortable life for customers around the world who enjoy a life with products using our motors.

#### **Management Guideline-2**

Transfer our technology and bring forth new opportunities for employment. We hope that our contribution can become a helping hand in leveling international economic disparities and stimulating global economic development.

#### **Management Guideline-3**

By placing “people” as an important managerial resource, we strive to heighten individual potential through work, and to raise more productive citizens of society.

#### **Management Guideline-4**

Conduct corporate activities that promote the preservation of our earth’s environment and our own human health.

**Mabuchi Motor's management philosophy is embodied in its basic environmental policy in the field of environmental management.**

## **Mabuchi Motor's Basic Environmental Policy**

1. We shall establish an environmental management system for taking business activities in consideration of the environment of the earth, and continuously try to improve the system.
2. We will strictly observe legal regulations relating to environment and other requirements, and positively determine and control self-imposed regulations.
3. To make the best use of limited resources, we will positively make effort in energy restriction, recycling and reduction in the amount of waste.
4. We will replace substances that cause a burden on the environment with substitutes.
5. We will positively conduct training and publicity activities to enhance the consciousness of the employees of environmental protection.
6. The environment policy will be penetrated to all employees and, if necessary, disclosed to the external parties concerned.

**Established on: September 27, 1998**

# Environmental Management System

## The Mabuchi Group promotes environmental management activities through an environmental management organization.

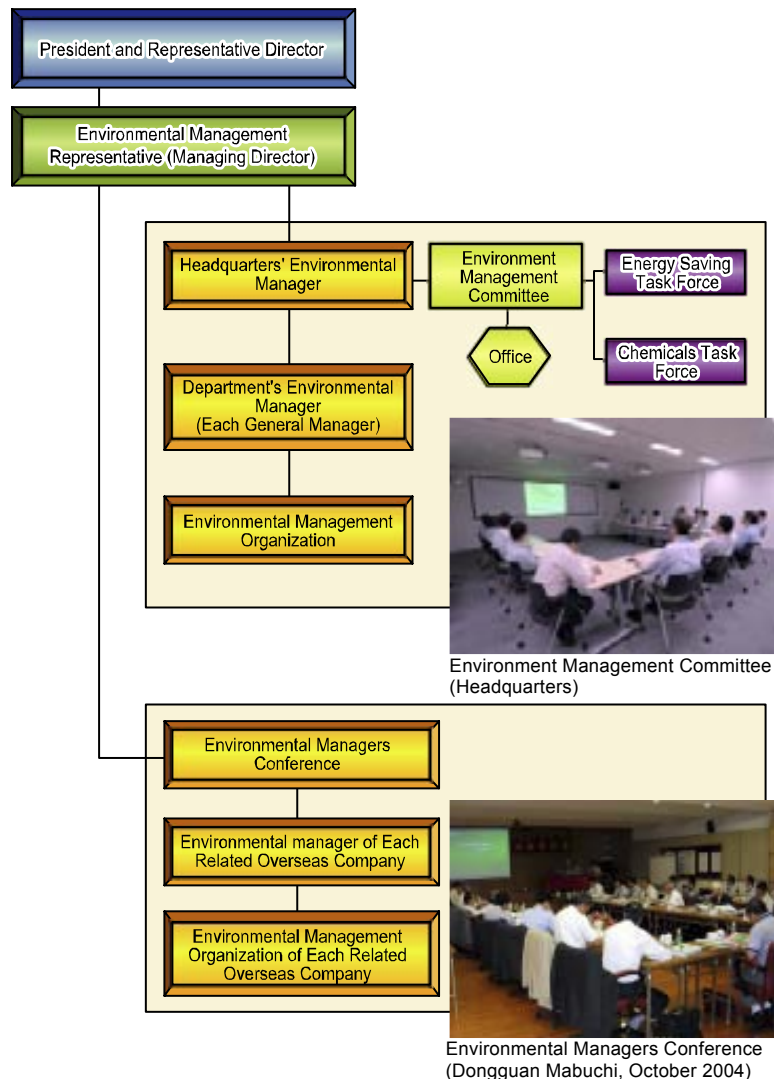
### Environmental Management System

To promote the environmental management activities of the entire Group, the Mabuchi Group established the Environment Management Committee in 1997 and is proactively engaged in environmental management.

The Environment Management Committee discusses and determines the Mabuchi Group's environmental policy, targets, measures, etc. In addition, the commit-

tee sets up task forces to plan such measures as reductions in chemical substances and CO<sub>2</sub> emissions.

We have been holding the Environmental Managers Conference, which consists of environmental managers from respective companies in the Mabuchi Group, every year since 2000. In 2004, the fifth conference was held in Dongguan Mabuchi (Hong Kong Mabuchi).





## **Environmental Management Activities**

In 1999, Mabuchi Motor set out to have the entire Group acquire the ISO 14001 environmental management system to further ensure the Mabuchi Groups' environmental activities.

To make ISO 14001 certification activities smoother and more efficient for Headquarters and related overseas companies, we have tried to limit the certification bodies that related overseas companies employ to Det Norske Veritas (DNV) since fiscal year 2004. Except for Dalian Mabuchi, the entire Group currently relies on DNV as its sole ISO 14001 certification body. (Dalian Mabuchi plans to switch to DNV from the current certification body on the next renewal audit.)

In addition to periodic audits by an external certification body, in-house environmental auditors regularly carry out internal environmental audits to not only check the ISO 14001 system but also ensure that the environmental policy is fol-

lowed and sufficient measures are taken.

The results of such internal audits are reported to top management, which uses them to review the environmental management system of the entire Group.



The management of Mabuchi Motor Headquarters being interviewed during an internal environmental audit

## **Environmental Education Activities**

The Mabuchi Group provides environmental education and training periodically for each employee segment.



Environmental education covering the reduced use of hazardous chemical substances

At the start of each fiscal year, Environmental Offices at Headquarters and each related company not only educate their respective employees about the Mabuchi Group's environmental objectives and environmental policy and the current year's environmental objectives and environmental management plan but also provide a refresher course on the Basic Environmental Policy.

For employees who are engaged in activities that have a significant environmental impact or are related to legal environmental regulations, special education and training concerning their activities

are provided in an attempt to prevent accidents and the like from occurring.

Environmental education based on ISO 14001 is provided to new employees at Headquarters and related companies.

Individual environmental education is also provided to new managers and new midcareer employees.

By providing such environmental education to all employees, we aim to enhance the environmental awareness of all Mabuchi Group employees and share the environmental policy and direction among them.

## Environmental Accounting

### The Mabuchi Group Introduced an Environmental Accounting System in Fiscal Year 2003, and the System was Introduced to a Few Related Overseas Companies on a Trial Basis in Fiscal Year 2004.

#### Expansion of the Introduction of the Environmental Accounting System

In fiscal year 2003, the Mabuchi Group introduced the environmental accounting system as an important tool that enables management to evaluate environmental management and supports managerial decision making. In fiscal year 2004, the system was introduced to Jiangsu Mabuchi (Wujiang, Jiangsu Province, China) on a trial basis, aiming at its development and expansion.

#### Report on Environmental Accounting Activities in Fiscal Year 2004

With the support and guidance of ERNST & YOUNG SHINNIHON the Mabuchi Group is establishing its environmental accounting system, which can calculate environmental cost by activity as a base for evaluating activities that address environmental problems.

For fiscal year 2004, we applied the environmental accounting system to Jiangsu Mabuchi in addition to Headquarters (including the Technology Center, hereinafter the same) to calculate the amount of investment and cost by activity for environmental preservation.

#### Analysis of the Calculation Result of Environmental Accounting for Fiscal Year 2004

In fiscal year 2004, the Mabuchi Group's investment and cost for environmental preservation amounted to 697 million yen and 1,262 million yen, respectively.

In fiscal 2004, a new office building for Headquarters was completed by employing state-of-art energy-saving technology. Environment-conscious facilities and

equipment, such as a double-skin structure with high heat insulation and turbo refrigerators that use CO<sub>2</sub> as a refrigerant, were adopted. For this purpose alone, expenditures for the investment and the cost of global environmental preservation amounted to 546 million yen and 34 million yen, respectively, in fiscal year 2004.

Because 100 percent of the Group's motors are manufactured in related overseas companies, the activities carried out at Headquarters are research and development and the supervision and management of related companies. The main items of environmental preservation costs relating to research and development are the reduced use of hazardous chemical substances and the research and development of energy-saving and resource-saving products. These costs account for about 66 percent of total environmental research and development costs.

Other environment-related investments include the cost of engaging in the purification work of contaminated soil and groundwater at Headquarters and the now-defunct Tatebayashi Factory. In fiscal year 2004, we carried out new purification work and spent 76 million yen and 223 million yen for the investment and cost, respectively. The environmental preservation effects in business activities included a 60-ton reduction in water use and a 6.5-ton reduction in CO<sub>2</sub> emissions per one million units of motors manufactured.

#### Schedule

We will expand the environmental accounting system to related overseas companies in a gradual manner and start calculating the economic effects resulting from environmental preservation measures.

## Basic Points of Mabuchi Motor's Environmental Accounting

1. Period:  
January 1, 2004, through  
December 31, 2004
2. Scope of calculation:  
Cost: Headquarters (including  
the Technology Center)  
Jiangsu Mabuchi  
Effect: Mabuchi Group
3. Standard for calculating  
environmental preservation  
costs
  - 1) Depreciation cost  
The depreciation cost in  
terms of financial  
accounting is reported.
  - 2) Labor cost  
All labor costs relating to  
environmental preservation  
activities are calculated.  
Formula: the number of  
operations x hours per  
operation x average wage  
by site
- 3) Research and development  
cost  
Costs specific to individual  
research and development  
themes are individually  
calculated. Those that  
cannot be directly grasped  
are proportionally calculated  
according to working hours  
by theme.
- 4) Standard for reporting  
compound costs  
Only costs relating to  
environmental protection  
activities are reported in  
accordance with  
Environmental Accounting  
Guidelines (in 2005).

## Environmental Cost

(yen in millions)

Classification	Fiscal year 2004				Fiscal year 2003		Main Efforts	
	Amount of investment	Compared with Previous Year (%)	Amount of cost	Compared with Previous Year (%)	Amount of investment	Amount of cost		
(1) Cost within business area	Pollution prevention cost	17.9	-	5.0	-	1.9	3.3	Countermeasures against exhaust gas from diesel cars, check and measurement of septic tanks, and water quality analysis and washing of chemical waste agent tanks, etc.
	Global environmental preservation cost	545.7	-	34.0	-	17.4	21.8	Introduction of energy-saving vehicles, introduction of energy-saving equipment to Headquarters' new office building, and introduction of hydrocarbon scrubbers, etc.
	Resources recycling cost	3.5	-	51.3	-	0.0	11.0	Recycle and proper disposal of waste
	Subtotal	567.1	-	90.3	-	19.3	36.1	
(2) Upstream and downstream costs	1.0	-	48.3	-	0.0	0.0	15.0	Recycling and proper disposal of packing materials
(3) Management activity cost	53.5	-	72.7	-	0.0	0.0	117.0	Maintenance and operation of the environmental management system, examination and analysis of contained chemical substances, disclosure of environmental information, environmental education for employees, etc.
(4) Research and development cost	-	-	827.0	-	0.0	0.0	584.7	Reduction in and abolition of the use of hazardous chemical substances, such as lead, cadmium, hexavalent chromium, and trichloroethylene as well as research and development of downsizing dies
(5) Cost for remedying environmental damage	75.8	-	223.4	-	23.3	23.3	60.2	Examination and cleaning of soil and groundwater
Total	697.4	-	1,261.7	-	42.6	42.6	813.0	

Note: The scope of calculation covers only Mabuchi Motor Headquarters in 2003 and Mabuchi Motor Headquarters and Jiangsu Mabuchi in 2004. Therefore, the comparison with the previous year is omitted.

## Environmental Effects

Details of effects		Classification of indicator	Value of indicator for fiscal year 2002 (basic unit)	Value of indicator for fiscal year 2003 (basic unit)	Value of indicator for fiscal year 2004 (basic unit)	Value of indicator compared with that for the preceding fiscal year (basic unit)
(1) Effects corresponding to cost within business area	1) Effects on resources input to business activities	Energy input (GJ)	989,555	1,011,221	1,128,110	Increase by 116,889 GJ
		GJ per million units	582	555	567	(Increase by 12 GJ per million units)
		Water input (10 thousand tons)	142	136	137	Increase by 10,000 tons
		Tons per million units	830	750	690	(Reduction by 60 tons per million units)
		Usage of PRTR substances (tons)	2,972	2,627	2,930	Increase by 303 tons
	2) Effects of environmental burden and waste from business activities	Tons per million units	1.7	1.4	1.5	(Increase by 0.1 ton per million units)
		Amount of discharged waste (tons)	39,603	39,676	43,711	Increase by 4,035 tons
		Tons per million units	-23.3	-21.8	-21.9	(Increase by 0.1 ton per million units)
		CO <sub>2</sub> emissions (tons)	172,092	173,733	176,942	Increase by 3,209 tons
		Tons per million units	101.3	95.4	88.9	(Reduction by 6.5 tons per million units)



## Environment-Conscious Products

### We Give Consideration to All Our Motors in Order to Reduce the Use of Substances that have an Environmental Burden and Save Resources and Energy.

#### Reduction in the Use of Hazardous Substances in Products

Mabuchi Motor is engaged in technical research and development of the environmental responsiveness of products. Particularly, we have been promoting the reduction in hazardous substances as well as the use of alternative substances for them since 1998.

In fiscal year 2004, we conducted the research and development of motors that comply with the regulations of the European Union (EU): the ELV Directive (legal regulations on end-of-life vehicles), RoHS Directive (legal regulations on the restriction of the use of certain hazardous substances in electrical and electronic equipment), and WEEE Directive (legal regulations on waste electric and electronic equipment).

As of now, among the six substances regulated, we have devel-

oped an alternative substance for cadmium in 1999 and, after a stepwise replacement, almost completed the replacement in 2003. Mabuchi Motor uses neither mercury nor the two types of brominated flame retardants. As for lead and hexavalent chromium, we are now replacing them with an alternative substance and plan to complete the replacement in December 2005.

In addition to reducing hazardous substances used in motors as part of our mission as a manufacturer, we are engaged in the research and development of motors that save energy and resources and are recyclable.

We will continue to further strengthen the research and development of environment-conscious motors.



Motors made by Mabuchi Motor with a reduced use of substances that cause environmental burden and a saving of resources and energy

**Resource Saving with an Increased Material Yield Percentage**

The motor parts manufacturing process includes press working, such as punching and drawing metal plates. For press working, how many products can be manufactured from one metal plate is essential to the effective use of resources. Needless to say, manufacturing more products with less amount of material reduces the cost of parts and enables us to provide less expensive motors.

For press working, it is desirable to reduce the amount of punching scrap left after punching. Therefore, we have elaborately studied how to minimize the distance between products to be punched (punching width). The punching width depends on the thickness of the material and the kind of material. Material feed accuracy is also important. So, we thoroughly reviewed the various elements of the press working design and redesigned the dies. As a result, yields increased by 5 percent, or in other words, the use of the material was reduced by 5 percent.

We manufacture motor housings by processing steel plates, approximately 38,000 tons of which we use annually. Saving 5 percent of this amount represents a saving of about 1,900 tons, and CO<sub>2</sub> emissions are reduced by about 3,000 tons. We plan to ex-



We will increase yields in press working and proactively promote the reuse of punching scrap. Now, 100 percent of the punching scrap generated by the Group is reused. The above photo shows punching scrap that is ready to be loaded onto collection trucks.

pand the application of this technology to other dies to reduce more CO<sub>2</sub> emissions.

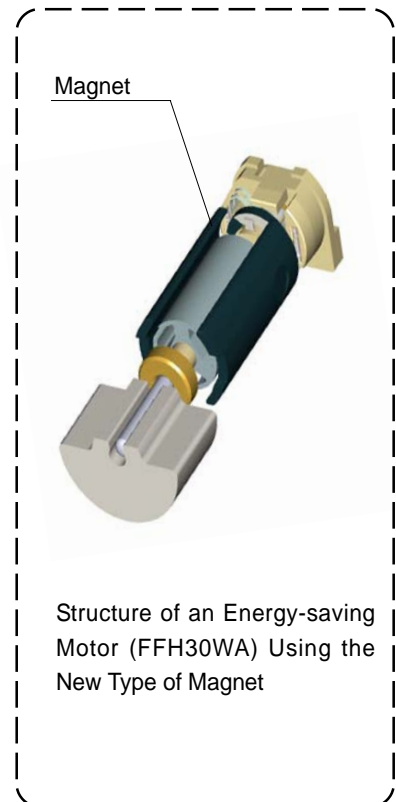
**Development of Energy-Saving Motors**

Our motors have been produced using ferrite magnets. Almost all magnetic motors have used ferrite magnets because they are inexpensive and have a stable magnetic force. On the other hand, sintered-rare-earth magnets have been used for small and highly efficient motors. However, while these magnets have a very strong magnetic force, they are expensive and, therefore, have not been used much in motors for general use.

Then, we decided to use plastic rare-earth magnets, which are formed by hardening rare earth using plastics. Because this magnet uses a small amount of rare

earth, cost is kept relatively low and its magnetic force has significantly increased from those of ferrite magnets. Compared with one of our conventional motors in the same size, output power has increased by about 20 percent. This has enabled our customers to use a motor one-size smaller and downsize their equipment, resulting in a reduction in resource use.

We are gradually increasing the number of models (mainly relatively small ones) in the series of motors that use this magnet.



Structure of an Energy-saving Motor (FFH30WA) Using the New Type of Magnet

## Environment-Conscious Products

### We Give Consideration to the Environment, from Research and Development to Shipment.

#### Weight Reduction of Gear Motors for Power Windows

Motors for automotive products are one of the most important products of Mabuchi Motor.

In recent years, the installation of electrical components is increasingly progressing to enhance the convenience and comfort of automobiles. The installation of electrical components increases the number and weight of components per vehicle, raising concerns over the increase in environmental impact. Mabuchi Motor considers it its mission to achieve both an increase in comfort and a reduction in environmental burden.

Mabuchi Motor states in its Basic Environmental Policy, "To make the best use of limited resources, we will positively make effort in energy restriction, recycling and reduction in the amount of waste."

We are proactively working to reduce the amount of environmental-burden-causing substances that we use in our products as much as possible, design products with regard to recycling, use smaller amounts of resources (i.e., make products smaller and lighter), and make as efficient use as possible of energy, production machines, sub-materials, and expendable supplies in the production process without unnecessary waste.

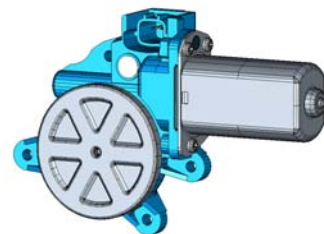
Mabuchi Motor took environmental aspects into consideration when it developed the PW series

of motors for power windows to be installed in vehicles from the early stage of development.

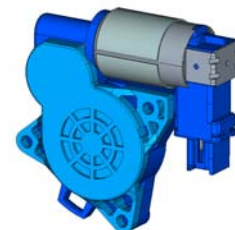
We reviewed the motor structure thoroughly and achieved a weight that is 10 percent less than that of our conventional model, 578 series, without sacrificing performance, thus contributing to better vehicle fuel efficiency. Usually, one vehicle has four power window motors, and the impact they have on fuel efficiency improvement is by no means small.

We will continue to make efforts to carry out research and development with environmental consciousness.

Motor for Power Window (conventional model)



Motor for Power Window (lightweight version for PW series)





### Reduction in Waste by Reusing Packing Material

Conventionally, cardboard (for cartons and partition boards) was used as packing material for products to be delivered to customers, and they were disposed of after being used only once. We

changed the material to reusable plastic, thereby achieving a reduction in waste.

As of now, this system is only for customers in Japan; however, we plan to extend this system glo-

bally by watching the infrastructure development situation, such as logistics.

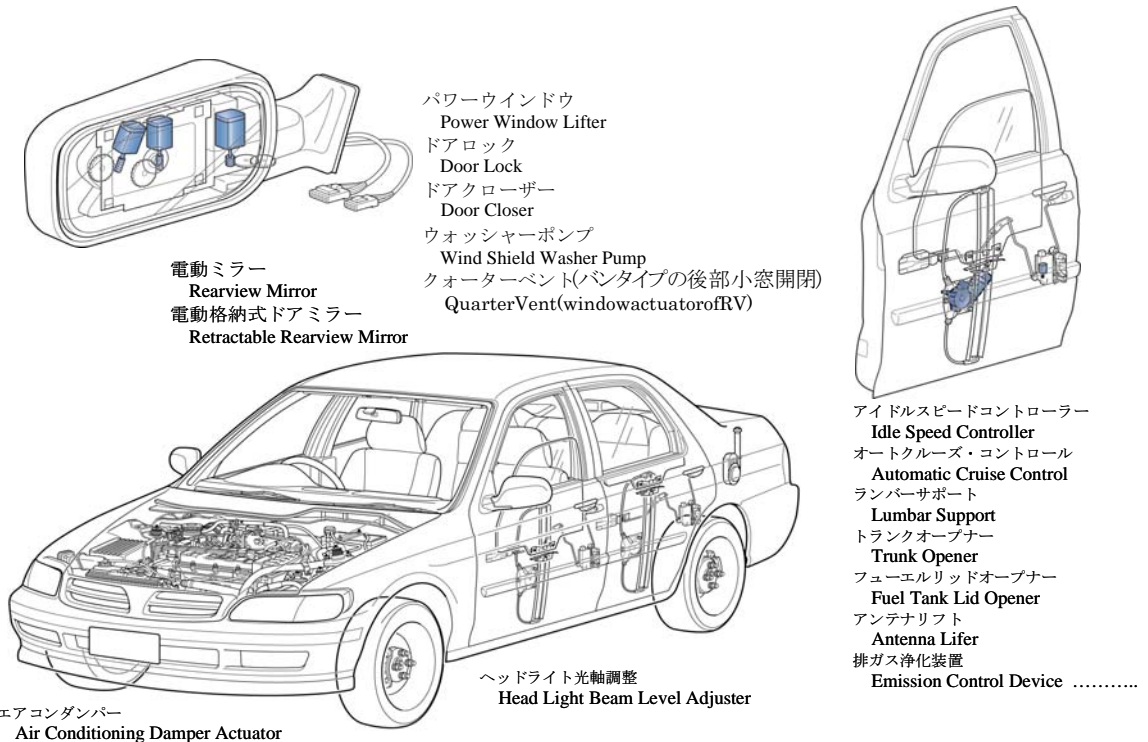


Cardboard packing (before improvement)



Plastic-container packing (after improvement)

### Data: Conceptual Illustration of Motor Use in Automotive Products (Related to Mabuchi Motor Products)



# Pollution Prevention

## Management of Chemical Substances in the Company

### Management of Chemical Substances at Production Sites

Mabuchi Motor regards ELV, WEEE, and RoHS Directives as core standards for chemical substances used in the raw materials and submaterials of products when providing customers with environment-conscious products. We make efforts not to cause environmental pollution by chemical substances, the use of which is inevitable.

Chemical substances used in production are managed by full-time personnel utilizing exclusive warehouses and carrying tools.



Safety inspection of the storage of reagents at Headquarters

PCB, which is an environmental pollutant, contained in old transformers and capacitors is properly managed by full-time personnel in storage places made specifically for this purpose.



Exclusive storage place for PCBs at Mabuchi Motor Headquarters

To ensure employees' health, indoor environments are examined by measuring VOCs in such environments.

In specific workplaces, such as cleaning rooms and crushing rooms, dust and solder smoke are measured periodically.



Periodic VOC measurement at Headquarters' new office building

#### What is VOC?

VOC stands for volatile organic compound and is a source of indoor air pollution. It is a chemical substance that may cause sick house syndrome. VOCs include formaldehyde, vinyl acetate, toluene, and xylene.

### PRTR Law and Mabuchi Motor

As for its Pollutant Release and Transfer Register (PRTR), Headquarters had no chemical substances that needed to be reported in 2004 because the amounts of specific chemical substances handled were all below levels that required reporting.

## Efforts toward Preventing Pollution

### Efforts toward Preventing Water Pollution

Mabuchi Motor uses water mostly for general everyday purposes and only a little for production purposes.



Construction of waste water treatment facilities (with a treatment capacity of 200 tons per day) at Dongguan Mabuchi was completed in August 2004.

However, even water used for general everyday purposes at a factory where many people work can cause environmental burden if discharged in places where public sewage facilities are not sufficiently developed.

To reduce environmental burden and avoid polluting the river, Dalian Mabuchi, Guangdong Mabuchi Factory 1, Dongguan Mabuchi, and Jiangsu Mabuchi have constructed waste water treatment facilities at their respective factory sites and treat all waste water at their factories until it meets local standards for sewage discharge.

Part of the treated wastewater is reused for general everyday purposes at the factory (e.g., to wash cars, water plants, and use in flushing toilets).

These efforts reduce local environmental burden and prevent river pollution as well as contribute to water resource conservation.

### Purification of Contaminated Soil and Groundwater at Mabuchi Headquarters

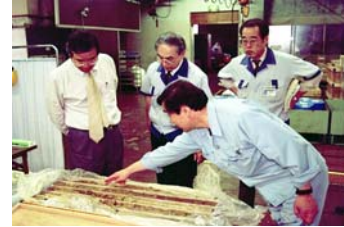
#### ○ Headquarters in Matsudo

For the construction work of the new office building for Headquarters, an examination was conducted to check soil contamination. The examination revealed the presence of tetrachloroethylene and trichloroethylene above specified environmental standard values around the place that used to be used as a cleaning room.

It has been over 25 years since we ceased using tetrachloroethylene. However, contamination from that time had not diminished. We elaborately conducted an additional examination and identified the area of contamination. We reported our finding to the local government, Matsudo City, and are now proceeding with decontaminating the area. We are employing the double extraction method for the decontamination, in which soil gas and groundwater are extracted and decontaminated using activated coal.

This method is said to be limited at lower concentrations of soil gas and groundwater contaminants. Therefore, we are conducting various tests on other purification methods to check the efficacy of each method.

In any event, we will continue our de-



An inspection tour of the soil decontamination site by Mr. Nobuyo Habuchi, Environmental Management Representative and Managing Director

contamination efforts until the contamination level reaches specified environmental standard values.

#### ○ Now-defunct Tatebayashi Factory site

Soil and groundwater contamination was also detected at Mabuchi Precision Industries Ltd. (Tatebayashi City, Gunma Prefecture), which used to be our related company.

We reported this to Gunma Prefecture and Tatebayashi City. We discussed this issue with them, had them understand our decontamination method, and began the decontamination work.

We employed the oxidation catalytic method, and the work went well. The place where the treatment was carried out has been completely decontaminated.

For groundwater, the decontamination work continues.



Groundwater decontamination facilities at the new site of Mabuchi Motor's Headquarters



# Prevention of Global Warming

## The Entire Mabuchi Group Makes Efforts to Reduce CO<sub>2</sub> Emissions.

### Effort to Reduce CO<sub>2</sub> Emissions

We use a substantial amount of energy to maintain our affluent lifestyles. However, such energy consumption in most cases emits carbon dioxide (CO<sub>2</sub>), which causes global warming.

The prevention of global-warming is a big challenge all of us face. Companies must address this significant issue as well.

Mabuchi Motor proactively carries out activities that reduce CO<sub>2</sub> emissions at overseas factories as well as at Headquarters in Japan. We do not use global-warming gases directly in manufacturing products. All of our global-warming gas emissions are CO<sub>2</sub> generated from energy use.

Electric power accounts for 85 percent of the energy used by Mabuchi Motor. Reducing electricity use, therefore, is a challenge for Mabuchi Motor in preventing global warming.

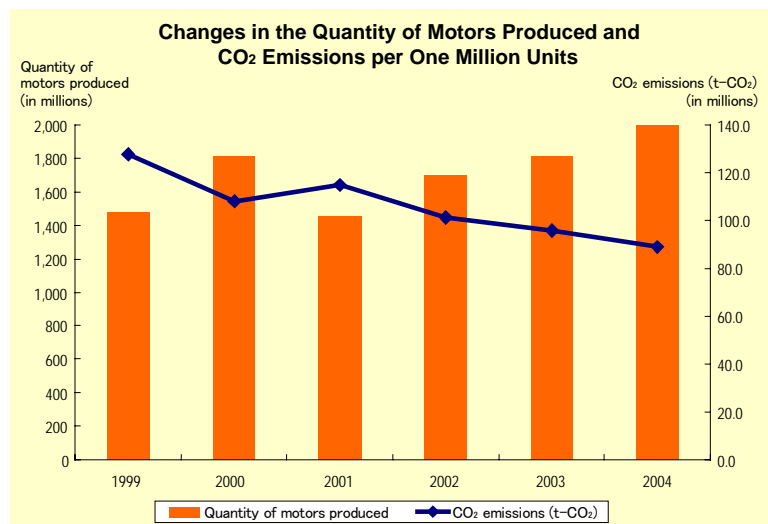
Since the prevention of global warming was first voiced, Mabuchi



Thermal insulating paint being applied to the factory roof of Vietnam Mabuchi (in fiscal year 2004)

Motor has taken various measures to reduce global warming. It was the integration of manufacturing factories that had a particularly significant effect.

With demand continuing to increase rapidly, the expansion of production scale was prioritized. In recent years, however, factories have been constructed with the environment also in mind instead of just the expansion of production scale. Old factories that were scattered or that implemented overlapping operations have been integrated into new factories, thus reducing waste in energy usage significantly.



## Earth-Friendly Facilities

The new office building for Mabuchi Motor Headquarters, completed in October 2004, was built based on Mabuchi Motor's Basic Environmental Policy, which states, "to make the best use of limited resources." For the building, energy savings were proactively pursued by introducing

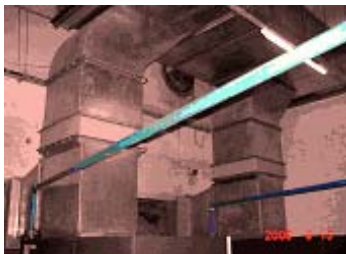
state-of-the-art technology and methods, such as a double-skin structure to minimize heat load and a building-frame thermal storage, which will bring about a 22 percent reduction in CO<sub>2</sub> emissions over the building's life cycle compared with those of standard facilities.



Above: Air-conditioning burden is reduced by promoting heat exhaust through the chimney effect created by the structure's double skin as well as by natural ventilation in conjunction with the atrium's skylight at dusk and at night.

Left: Electricity used for lighting is saved with the effective use of natural lighting through a double skin.

Most of the energy consumed in factories is electric power, and it is used for various purposes. Because Mabuchi Motor is mainly engaged in assembly processing, it has no ultralarge facilities, which are common when producing raw



Dalian Mabuchi developed and installed facilities that use heat at about 40 degrees Celsius generated by operating compressors as a source of heating inside factory buildings in winter. The use of the facilities led to a 150-ton reduction in coal consumption per year for heating, contributing to lower CO<sub>2</sub> emissions caused by the use of coal.

materials. Among our facilities and equipment, compressors to produce compressed air use a relatively large amount of energy.

In fiscal year 2004, we endeavored to reduce the amount of electric power used by these compressors.

To operate the system effectively, we installed a number of compressors and use only the appropriate number of compressors according to the level of the load.

On the other hand, because a number of factory buildings are located throughout a large site, the compressors need to be decentralized instead of being centralized.

To meet these contradictory

demands, the load variation for each building is measured to install shared systems to save energy.

As for the measures to reduce CO<sub>2</sub> emissions by integrating and closing factories or the measures relating to large-scale equipment, almost everything has been done, and there are no measures left to be taken.

From now on, we will need to take measures that deal with not only these large-scale items but also detailed items that cause unnecessary CO<sub>2</sub> emissions even though the effect may be smaller. From this perspective, we are now also examining the use of compressed air in our processes.

# Waste Reduction

## Waste Reduction by Increasing the Recycling Rate

### Efforts to Reduce Waste

Mabuchi Motor has been striving to reduce waste and increase recycling (resource recovery) as part of its global environmental conservation activities.

In fiscal year 2004, Headquarters was the first to introduce refuse zero emission activities to enhance the waste reduction activities of the entire Mabuchi Group.

Reducing solid landfill waste is essential to promoting refuse zero emissions. Burnable refuse generated by Headquarters is incinerated in refuse furnaces to significantly reduce its amount. However, incinerated ash remains, which is then disposed of in landfills. So, no generation of burnable refuse was set as an objective, and it is now possible to recycle thumb-size paper refuse into recycled paper.

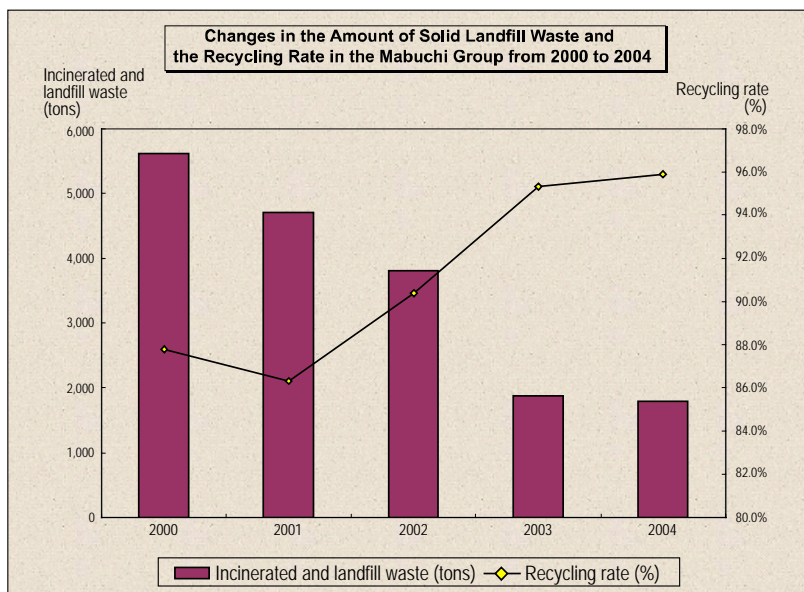


Panel showing how to dispose of waste by type at Headquarters

We have thoroughly reduced unsortable waste and endeavor to develop and manage waste processing companies that can recycle waste.

These activities enabled us to achieve a recycling rate of 96 percent as of the end of fiscal year 2004. In addition, a new recycling method was developed for items that are difficult to recycle, such as vinyl chloride and metal-plastic mixtures.

We will continue our efforts to further increase the recycling rate.





## Development of Recycling Methods and Resource Recovery from Waste

### A 100 Percent Recycling Rate for Grinding Stones Achieved by Dalian Mabuchi

The motor parts manufacturing process at Dalian Mabuchi's factory uses grinding stones to grind motor shafts. In the past, Dalian Mabuchi would ask waste processors to dispose of the waste grinding stones as solid landfill waste. This process was found to be costly and to place a heavy environmental burden on the global environment.

Therefore, Dalian Mabuchi endeavored to undertake the recycling of grinding stones in 2004.



Used grinding stones ready to be recycled

After looking at relevant waste processors in China, one was found that could recycle materials similar to grinding stones.

The used grinding stones that were previously discarded by Dalian Mabuchi are now reprocessed by this waste processor and reused as raw material for fire resisting material.

Dalian Mabuchi achieved a 100 percent recycling rate for its grinding stones in fiscal year 2004.

### Efforts to Reduce Waste in the Construction of the New Office Building for Mabuchi Motor Headquarters

The second phase of the construction of Mabuchi Motor's new office building involved demolishing the old office building. Generally, a



Demolishing the old office building

large amount of debris is generated from demolition work, causing a significant environmental burden.

To remain in line with its Basic Environmental Policy of "to make the best use of limited resources," Mabuchi Motor made efforts to recycle the debris generated from the demolition work with the cooperation of Shimizu Corp., a construction contractor.

Concrete debris, which is usually generated the most in the demolition of a building, was crushed at the site, and part of it was used in the roadbed for the second phase of the construction of the new office building. (The rest was used in construction work elsewhere.) Asphalt fragments were recycled into asphalt again after the reforming process.



Crushing and sorting of demolition debris



Demolition debris being shipped for recycling

With the inclusion of additional measures, such as sending wood debris to a recycling factory to be turned into wood chips, a total of 16,440 tons, or 99 percent of the 16,580 tons of demolition debris generated in the second phase of the construction of the new office building, were recycled.

# Communi- cation

## Mabuchi Motor Proactively Discloses Information both Inside and Outside the Company.

### Enhancement of Website

To widely disclose environmental information inside and outside the company, Mabuchi Motor has been posting environmental information on its website. Corresponding to the website's revision in fiscal year 2004, its contents were reviewed and new contents were added.

The revised website avoids, to the farthest extent possible, descriptions that are difficult to understand in order to facilitate better understanding.



Environmental page from Mabuchi Motor's website

### Communication to Employees

Monthly in-house magazines are published to release environmental information to and promote the environmental consciousness of employees. The June and December issues of each year contain feature articles on the environment.

In the June 2004 issue, the natural environment on Yakushima Island was introduced to explain how valuing nature relates to environmental conservation activities and corporate social responsibility (CSR).

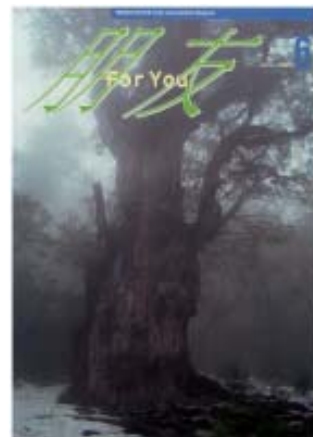
These articles significantly contribute to promoting the environmental consciousness of employees. For example, many of

those who read the above article gave such feedback as, "I didn't realize how much natural beauty Japan had," "I felt a strong urge to go back to the simple life, take a new look at nature, and preserve nature for the future," and "Environmental responsiveness should begin with protecting the immediate natural environment."

Aiming to spread environmental information throughout the company, "ECOLOG," an environmental information database, has been made available on the intranet since fiscal year 2003.

The contents of ECOLOG were enhanced in fiscal year 2004 and now centers on information related to reducing the use of hazardous chemical substances in order to promote research and development as well as sales activities centered on environment-conscious motors.

In particular, the original text of European environmental regulations, such as ELV, WEEE, and RoHS, are followed in order by a Japanese translation, regulations in the industry, and Mabuchi's regulations, which also contributed to the research and development of environment-conscious motors.



Mabuchi Motor's monthly in-house magazine

## Contributions to Society

### Mabuchi Motor Proactively Carries Out Social Contribution Activities as a Good Corporate Citizen of the Earth.

#### Social Contribution Activities

As stated in our Management Philosophy, we are committed to “contributing to international society and ever-expanding our contribution,” and in order to carry this out, both Headquarters and each related overseas company must carry out social contribution activities in many aspects.

#### ■ Support of Local Education Activities

Dalian Mabuchi provides scholarships to needy students at three elementary and junior high schools in the local community as a contribution to the local community.

These students are also invited to the company periodically to take a tour of the company as part of their social education.



Students from the local community taking a tour of the company



The general manager handing out school supplies

#### ■ Support of the Aged and Physically Challenged

As part their contributions to local communities, both Mabuchi Motor Headquarters and each related overseas company carry out various activities and programs that support the aged and physically challenged in the community.



The above photo was taken at a show held at the local Fukuei Nursing Home by the volunteers of Guangdong Mabuchi Factory 2.

In addition to the above activities, volunteers of this factory carried out planting and cleaning activities, among others, in the local community during their holidays. In fiscal year 2004, social contribution activities were conducted by a total of 950 people for 50,000 man-hours.

In fiscal 2004, Dalian Mabuchi donated to the Dalian Otherly-Abled Persons Foundation's program to support the physically challenged in the local community.



The general manager of Dalian Mabuchi meeting with the head of the Dalian Otherly-Abled Persons Foundation

# Contributions to Society

## Aiming to Create Harmony by Contributing to the Local Community



In spring, housewives from the local community take photos in front of the new office building and rows of cherry trees.

### Contributions to the Local Community through the New Office Building

Mabuchi Motor's new office building was completed in October 2004.

This new office building was constructed by taking into consideration not only the company but also coexistence with the local community.

- Contributions to the local scenery and landscape
  - Underground power lines
  - Open front garden—a suitable entrance to the Matsuhidai industrial park (Noma bank/Biotope) (See the next page)
  - Rows of cherry trees/Completed of sidewalks
  
- Contributions to security and crime prevention
  - Sidewalks provided thanks to the contribution of private land (200 m<sup>2</sup>)/Wider roadways
  - Renovation of a bus stop
  - Streetlights (ecology lighting)

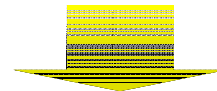


Streetlights powered by solar and wind energy

### The Headquarters location before and after the laying of power lines underground



Before laying power lines underground



After laying power lines underground



Widened sidewalk with a row of planted cherry trees



### **Biotope Created at the Mabuchi Headquarters' New Office Building Location**

The word biotope originated from the Greek bio, meaning "life," and topos, meaning "place." The word is said to be first used by Haeckel, a German biologist, who referred to the "space where living creatures live" as a biotope and advocated its importance.

In Japan, the first biotopes were created in the 1990s. It is said that biotopes would have a significant role in restoring nature that was once lost and providing children with a place for environmental education.

Mabuchi Motor, as a part of its corporate social contributions, created a biotope together with the construction of the new office building at its own site.

In the open front garden, space for communing with water has been allocated, such as the biogarden (garden incorporating natural elements) that surrounds the walking space that leads from the south entrance of the site to Headquarters' new office and the cascade (stepped waterfall) that flows down the gradual slope from the front of the cafeteria. For the vegetation in the front garden, local potential vegetation was used in abundance. Consideration was given to harmonizing with the surrounding plants.



Open deck and the cascade



Cascade



Front garden



Biotope



Planted vegetation in the front garden: *Enkianthus perulatus*



Planted vegetation in the front garden: *Lespedeza bicolor*



Wild birds also fly in.



## History of Mabuchi Motor Environment Conservation Activities

June 1993	Codified "business activities for developing, manufacturing, and selling small electric motors without sacrificing environment of the earth and the health of people" in Management Guidelines in "Management Philosophy".
December 1993	Reported on development of the first cadmium-free materials for motor commutators
January 1994	Set targets of recycling rate and reduction of in-house waste as a year program and start continuous control of numeric targets.
June 1997	Set up "Environment Management Committee" for control of information regarding environmental problems in Business Platform Innovation Headquarters.
January 1998	Revised the Standards for Waste Disposal Control to the Procedures based on 3R.
July 1998	Set up ISO 14001 certification acquisition project.(called E-Project) in Business Platform Innovation Headquarters. Started prior survey to acquire ISO 14001 certification.
October 1998	Established Mabuchi Group "Basic Policy for Environment." E-Project started its operations to acquire ISO 14001 certification.
May 1999	Established "Environment Policy" of Headquarters according to the requirements of ISO 14001.
May 1999	Announced "Interim Environmental Target" of Headquarters.
June 1999	Started operation of EMS(Environmental Management System) of Headquarters
December 1999	Headquarters acquired ISO 14001 certification.
January 2000	Started to fully eliminate and reduce the use of trichloroethylene.
January 2000	Started activities to develop a new method of lead free soldering.
March 2000	Kaohsiung Mabuchi (Kaohsiung, Taiwan) acquired ISO 14001 certification.
May 2000	Completed full elimination of use of trichloroethylene in Headquarters.
July 2000	Malaysia Mabuchi (Malaysia, Ipoh City) acquired ISO 14001 certification.
August 2000	Jiangsu Mabuchi (Jiangsu, China) acquired ISO 14001 certification.
August 2000	Dalian Mabuchi (Liaoning, China) acquired ISO 14001 certification.



September 2000	Started development of hexavalent chromium free material for motors.
September 2000	Held Environmental Managers Conference
October 2000	Started green procurement activities.
December 2000	Completed evaluation of selection of cadmium-free substitutes.
December 2000	Taiwan Mabuchi (Hsinchu City, Taiwan) acquired ISO 14001 certification.
December 2000	Hong Kong Mabuchi (Hong Kong, Guangdong, China) acquired ISO 14001 certification.
December 2000	Started operation of returnable-container system in some regions.
March 2001	Vietnam Mabuchi (Bienhoa City, Vietnam) acquired ISO 14001 certification.
July 2001	Lead-free soldering for motors was approved by Sony "Committee for Electrical Component Standardization."
December 2001	Completed arrangement of mass-production of lead-free soldering.
December 2001	Posted Environmental Report on website
April 2002	Started sample shipping of hexavalent chromium free motors.
July 2002	Detected soil pollution by tetrachloroethylene in a section on the premises of Headquarters and started its purification and improvement.
September 2002	Started supply of motors satisfying EU Directives of ELV and RoHS.
May 2003	Started construction work of Mabuchi Motor's new Headquarters building to which state-of-the-art technology to reduce environmental load was introduced.
October 2003	Started establishment of environmental accounting system with guidance from ERNST & YOUNG SHINNIHON.
May 2004	Introduced hydrocarbon scrubbers
June 2004	Dalian Mabuchi awarded as a model company on environmental conservation by environmental protection administration of Dalian, China.
September 2004	Jiangsu Mabuchi introduced environmental accounting system
October 2004	Construction of Mabuchi Motor Headquarters' office building completed using state-of-the-art technology.



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