

Like all other industrial concerns, Minebea engages in manufacturing activities that exert a significant impact on the environment. We acknowledge this fact and are pursuing a variety of measures to protect the environment in and around our plants. These include measures aimed at rehabilitating contaminated plant sites and minimizing the burden of current manufacturing activities

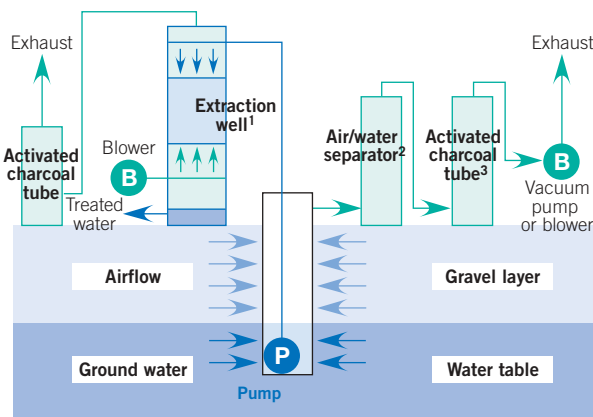
REHABILITATION OF CONTAMINATED SOIL AND GROUNDWATER

Cleanup of Contamination from Organic Chlorinated Solvents

The superb cleaning capabilities of tetrachloroethylene, trichloroethylene and other organic chlorinated solvents supported their widespread, long-term use in cleaning processes for precision components, PCs and electronic components. However, because these solvents are heavier than either water or air, leakage from facilities and containers—in the form of liquid and vapor—has resulted in significant accumulations in soil and groundwater.

Because it had previously used organic chlorinated solvents in its manufacturing processes, Minebea conducted voluntary inspections of its

plants in Japan. These inspections confirmed contamination at the Karuizawa Manufacturing Unit, Fujisawa Manufacturing Unit, the site of the former Ichinoseki Factory and the Omori Manufacturing Unit. Minebea promptly informed local authorities of the results of its inspections and, in line with directives issued thereof, implemented cleanup measures. The principal methods in use here are dual extraction and air stripping. Minebea has also implemented voluntary inspections and appropriate cleanup measures at its overseas plant as required.



Dual extraction and air stripping system, a pump system that removes contaminated soil vapor and groundwater



Soil and groundwater purification system at the Fujisawa Manufacturing Unit

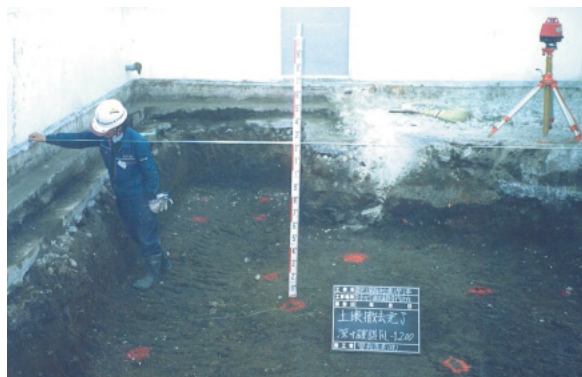
Glossary

- 1. **Extraction well**  
Extracted groundwater is drawn up and discharged into the well from the top, while air is driven up from the bottom, stripping solvent contaminants from the groundwater.
- 2. **Air/water separator**  
This device is used to separate the exhaust into vapor and water.
- 3. **Activated charcoal tube**  
The airflow is passed through a tube of activated charcoal, which adsorbs the contaminants.

► **Soil Replacement at Former Color Plating Facility (Omori Manufacturing Unit)**

Owing to the termination of its color plating operations, in November 2000 the Omori Manufacturing Unit closed its color plating facility. Because of the nature of the facility's operations, Minebea conducted a voluntary inspection of the site after its closure. This inspection revealed concentrations of cyan and hexavalent chromium in the soil that exceeded domestic standards.

Minebea promptly reported the results of its inspection to the Ota Ward Office, in Tokyo, where the Omori Manufacturing Unit is located, and formulated a soil decontaminating program for immediate implementation. This involved removing the top layer of soil from the facility site to a depth of one meter and replacing it with new soil. Tests in May 2002 confirmed the absence of contaminants in the soil. This was reported to the Ota Ward Office and the program declared complete.



Removal of contaminated soil

■ **OZONE PROTECTION EFFORTS**

► **Elimination of Specified CFCs and Ethane as Cleaning Agents**

In July 1991, Minebea organized the Anti-CFC Committee with the aim of phasing out the use of specified CFCs and ethane as cleaning agents. In 1993, Minebea became the first bearing manufacturer in the world to completely eliminate specified CFCs and ethane as cleaning agents from all production processes. These and other efforts to protect the ozone layer have been recognized three times with stratospheric ozone protection awards from the U.S. EPA<sup>4</sup>.

**Glossary**

**4. U.S. EPA: U.S. Environmental Protection Agency**

Established in December 1970, the U.S. EPA is an independent agency that develops and enforces environmental regulations, performs environmental research, sponsors pollution prevention efforts, advises the president and provides support for conservation-related councils.



EPA Stratospheric Ozone Protection Award plaque

1993: Minebea's Thai subsidiaries and the parent company receive the U.S. EPA's Stratospheric Ozone Protection Award.

1995: Goro Ogino, then President of Minebea, receives the Stratospheric Ozone Protection Award for individuals.

1997: The Minebea Group is selected from among the previous award winners from the previous decade to receive the Best-of-the-Best Stratospheric Ozone Protection Award.

■ LOWER WASTE OUTPUT/“3R” ACTIVITIES

▶ Install Oil Recovery Equipment (Thailand)

Minebea’s plants in Thailand have introduced oil recovery equipment on cutting lines. All cutting oil recovered—approximately 50,000 liters annually—is reused. This is an excellent example of how efforts to use resources responsibly can also contribute to lower manufacturing costs.



Oil recovery equipment

▶ Recycle Sludge from Wastewater Treatment Facilities (Hamamatsu Manufacturing Unit)

Sludge from the Hamamatsu Manufacturing Unit’s wastewater treatment facility (generated primarily through ferrite production) is dried by an intermediate waste processing firm and handed over to a recycling firm. This firm transforms the dried sludge material into a variety of materials for construction and civil engineering using a technique called “Soil Best.”



Recycle sludge from wastewater treatment facilities (Hamamatsu Manufacturing Unit)

▶ Reduce Perishable Waste and Promote Composting (Karuizawa Manufacturing Unit, Hamamatsu Manufacturing Unit)

In addition to waste generated through manufacturing activities, all Minebea Group plants also produce significant volumes of perishable waste from staff cafeterias. Until recently, the Hamamatsu Manufacturing Unit generated a monthly average of more than one ton of perishable waste. With the installation of a perishable waste processor, however, this has decreased by three quarters (primary processing). Waste from the processor is collected by a fertilizer manufacturer for composting and transformation into fertilizer (secondary processing) and returned to the plant for use on plant grounds.



Perishable waste processor (Hamamatsu Manufacturing Unit)

▶ Improve Storage Areas for Grinding Swarf (Omori Manufacturing Unit)

Grinding swarf, generated through the cutting of metal materials, is a particular nuisance as it tends to adsorb cutting oil, thereby soiling the area around it. The Omori Manufacturing Unit has sought to remedy this problem by installing two machines—one each for steel and aluminum—that pulverizes the sludge and compacts it into briquets. This move has sharply reduced the frequency with which sludge must be collected from the storage area, as well as facilitated the extraction of cutting oil. The briquets are easy to handle and have value as a source of metal. These machines have also been installed at plants in Thailand.



New grinding swarf storage area (Omori Manufacturing Unit)

■ PREVENT WATER CONTAMINATION

▶ Wastewater Processing in Japan (Fujisawa Manufacturing Unit)

The Fujisawa Manufacturing Unit—which dates back to 1921, when it's predecessor moved to the current site—engages in integrated production of fasteners for automotive and aerospace applications. The plant has long boasted a thorough and effective processing capability for wastewater generated through its manufacturing activities. In April 2002, it introduced a new, comprehensive wastewater processing facility with the aim of reducing the burden it places on a nearby river. In July 2002, the plant received an award from the Kanagawa Global Environment Conservation Promotion Council.



Wastewater processing facilities (Fujisawa Manufacturing Unit)

	Legal Limit	Voluntary Limit	Maximum	Average
	(Mg/liter)			
pH	5.8-8.6	6.6-7.8	7.2	6.8
COD	60	30	28.0	20.0
BOD	60	30	21.0	15.0
SS	90	10	8.0	5.0
n-Hexane extractions	5	2	1.0	<1.0

▶ Wastewater Processing in China (Shanghai Factory)

The Shanghai Factory is situated in a scenic area near Lake Daishan-hu, a famous tourist spot as well as the source of Shanghai's drinking water. To protect the quality of the water in the lake, Minebea has installed advanced wastewater treatment facilities with a round-the-clock automatic monitoring system.

▶ Wastewater Processing in Thailand

Much of Thailand remains largely agrarian, with rice the principal crop. Minebea has equipped its Bang Pa-in, Ayutthaya and Lop Buri plants with high-performance wastewater treatment facilities with the aim of protecting the quality of water in and around its plants and of serving as a model for other foreign companies establishing plants in the kingdom.

	Legal Limit	Voluntary Limit	Maximum	Average
	(Mg/liter)			
pH	6.0-9.0	7.0-8.0	8.0	7.6
COD	60	20	16.7	13.2
BOD	15	5	2.2	1.3
SS	70	10	5.0	3.0
n-Hexane extractions	3	1	1.0	0.7

	Legal Limit	Voluntary Limit	Maximum	Average
	(Mg/liter)			
pH	5.5-9.0	6.5-8.5	8.5	8.2
COD	120	80	24.0	17.2
BOD	20	18	5.0	1.8
SS	50	20	6.0	1.7
n-Hexane extractions	5	5	1.5	0.8



Wastewater processing facilities (Shanghai Factory)



Wastewater processing facilities (Bang Pa-in Plant)

## ■ PREVENTION OF AIR POLLUTION

### ▶ Exhaust Recovery System for Cleaning Facilities (Karuizawa Manufacturing Unit)

Cleaning facilities that use solvents to remove particulates from air emissions emit exhaust that contains solvent vapors. Such exhaust is a cause of contamination and global warming if released directly into the atmosphere. At the Karuizawa Manufacturing Unit, Minebea has installed exhaust recovery systems in all cleaning facilities to minimize emissions of solvent vapors.



Exhaust recovery system installed at Karuizawa Manufacturing Unit

### ▶ Measure Solvent Vapor Concentrations (Karuizawa Manufacturing Unit)

At the Karuizawa and Matsuida factories, Minebea regularly measures concentrations of solvent vapor in exhaust from cleaning facilities. This step reflects Minebea's recognition that while solvent vapors emissions are not covered by environmental legislation, decomposition or chemical reactions in the atmosphere may produce hazardous substances.



Measurement of solvent vapor concentrations (Matsuida Factory)

## ■ REDUCTION OF ENERGY CONSUMPTION/CONTRIBUTION TO PREVENTION OF GLOBAL WARMING

### ▶ Procure Green Energy (NMB Electro Precision, Inc.)

NMB Electro Precision, based in Sendai, Miyagi, has joined the Tohoku Green Power Fund, the objective of which is to support efforts to promote natural forms of power generation. This fund, which acts through the Industrial Vitalization Center for Tohoku, assists companies in the Tohoku region to install new solar and wind power facilities.



Windmills

### ▶ Reduce Number of Oil Mist Collectors (Singapore)

Pelmec Industries (Pte.) Ltd. has taken steps to increase the seal of its cutting machines, thereby significantly reducing the amount of oil mist released into the air by these machines. This has enabled the company to reduce the number of oil mist collectors it uses to two, from five, thereby lowering energy and oil consumption.



Oil mist collectors (before)



Oil mist collectors (after)

■ VOLUNTARY EFFORTS

▶ Environmental Patrols



Environmental patrol (Hamamatsu Manufacturing Unit)

Minebea is reinforcing voluntary environmental monitoring by implementing regular, exhaustive patrols at all of its plants. These patrols ensure, among others, that hazardous chemical substances are properly stored, energy is not wasted, environmental management systems function effectively and plants do not pollute surrounding areas.

■ ACHIEVEMENTS OF PLANTS OUTSIDE JAPAN/ASIA

▶ U.S. Group Company Wins EPA Award

In April 2003, the HiTech Division of New Hampshire Ball Bearings, Inc., a manufacturer of ball bearings for aerospace applications, received an Environmental Merit Award from the U.S. EPA. The award was given in recognition of the company's success in the EPA's National Environmental Performance Track program. Since joining the program in December 2000, facilities involved have collectively reduced energy consumption by 1.7 million kilowatts and materials used by more than 27,000 pounds.



U.S. EPA Environmental Merit Award ceremony