

# ENVIRONMENTAL PRESERVATION

Recognizing its societal obligation as a corporation to help sustain the health of the global environment, THK is working to continuously reduce the burden it places on the environment and to sustain and improve the natural environment.

As a pioneering global manufacturer of vital machinery components, the THK Group has made an economic and social contribution via the development of linear-motion systems such as LM guides. The linear-motion technology that THK Group has developed converts slippage into a controlled rotary motion. This translates into a range of environmentally positive benefits, including lower energy consumption, greater compactness, less need for lubricants, and faster and quieter machinery operation. Overall, THK Group products make a major contribution in terms of reducing the environmental impact of machinery.

The THK Group instituted a basic environmental policy in fiscal 2001 that designates environmental preservation as a key management issue. The THK Group is committed to ensuring that employees understand and follow its policy on the environment. The THK Group instituted a program of specific environmental management initiatives with performance targets in fiscal 2005. The program covers various

activities to conserve energy and resources, reduce consumption of harmful substances, and promote the development of eco-friendly products.

The THK Group published its first CSR Report in 2007. This provided an opportunity to review the environmental policies of the THK Group and related essential environmental preservation measures and to consider what are appropriate environmental management performance targets. Going forward, The THK Group plans to continue developing its program of environmental preservation activities, without losing sight of the goal of leaving the world in a better state for the next generation.

Please note that, for the purposes of this environmental section (pp. 32–37), the THK Group is defined as the five parent company production facilities in Japan plus THK NIIGATA CO., LTD. and DAITO SEIKI CO., LTD. This also applies to the scope of the various data presented in this section.

## THK Group's Basic Policy Regarding the Environment

Since the development of the LM Guide, the THK Group have contributed to both society and the economy through their pioneering role as manufacturers of linear motion systems and machine components. We also believe that it is a company's social responsibility to leave the global environment in a healthy state for the next generation, which is why we are undertaking the following initiatives to continually decrease environmental burdens and maintain and improve the natural environment.

1. Conservation of the environment is considered a major management concern, and we are striving to accurately grasp the impact on the environment produced by the Group's business activities, products, and services. Every division participates by setting relevant environmental goals.
2. In addition to following environmental laws, we set self-imposed standards for Group companies and regularly review them to improve the efficiency and effectiveness of our environmental management.
3. We will continually promote the development of products that help reduce environmental burdens.
4. We will continually promote conservation and recycling of resources, with particular attention to reducing and recycling waste from our manufacturing divisions.
5. To promote greater unity in our environmental activities, we will provide guidance and support to our affiliates and business partners, and strive to work in cooperation and harmony with local communities.
6. This basic policy regarding the environment shall be disseminated to all divisions in the Group through education, training, and activities designed to improve awareness. We will disclose information concerning the environment to parties within and outside the Group in a timely manner.

## Environmental activities and targets

Area	Objectives and goals	Main activities
Energy conservation	<p>Cut greenhouse gas emissions</p> <p>Achieve 15% reduction in CO<sub>2</sub> emissions per unit of output relative to FY2005 levels by FY2010</p>	<p>(1) Energy diagnostics</p> <p>(2) Energy conservation</p> <p>(3) Use of clean energy</p>
Material conservation, zero emissions	<p>Reduce environmental impact; achieve zero emissions</p>	<p>(1) Input controls (materials, parts and by-products) to reduce usage and boost per-unit yields</p> <p>(2) Controls on emissions and final waste disposal</p> <p>(3) Material re-use/recycling</p>
Harmful substance controls	<p>Eliminate and control harmful substances in THK Group production/distribution activities</p>	<p>(1) Substitution of PRTR-designated substances</p> <p>(2) Green procurement and purchasing</p>
Environment-friendly products and services	<p>Develop products and supply services using LCA (Life Cycle Assessment) methods</p>	<p>(1) Cage-embedded product series development</p> <p>(2) Extension of service life and maintenance-free periods</p>

### Energy conservation and CO<sub>2</sub> emissions reduction

Global warming poses a serious threat to humans and ecosystems around the world. Sudden increases in temperatures could result in rising sea levels, abnormal weather patterns and other ecosystem changes. Such phenomena could cause extensive physical damage and harm to human populations in the form of freshwater depletion, impacts on agricultural and fishing industries, crop failures and damage due to extreme weather events. The THK Group regards global warming as an important environmental issue requiring action to curb emissions of CO<sub>2</sub> and other greenhouse gases.

The THK Group operations use considerable amounts of energy in manufacturing processes such as machinery fabrication, grinding and heat treatment as well as in air conditioning, lighting and compressed air systems. These operations are the largest sources of power consumption and CO<sub>2</sub> emissions for the THK Group. Comprehensive efforts to conserve power and to reduce the energy consumption of these facilities form the centerpiece of the company's efforts to combat global warming.

Since the company's establishment, QC circles and other programs aimed at improving productivity by reducing waste ("3M" activities) or workplace clutter ("5S" activities) have been developed across the THK Group. These activities often generate practical ideas from individual employees for reducing power consumption. Implementation of such proposals helps to conserve energy.

As part of efforts in Japan to meet Kyoto Protocol targets, in fiscal 2005 the THK Group formulated a plan to achieve a voluntary CO<sub>2</sub> emissions reduction target of 15% in terms of emissions per unit of production output (measured as kg-CO<sub>2</sub>/'000 yen of output) relative to actual fiscal 2005 emissions by fiscal 2010. Total and specific CO<sub>2</sub> emissions both increased 8.5% in fiscal 2007 relative to the previous year due to the completion of several production facilities during the year, which boosted the THK Group power consumption.

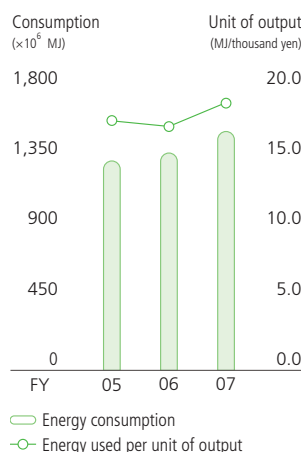
Specific factors behind this increase included the start-up of operations at the No. 3 plant at the Yamagata site (built to accommodate projected growth in demand) and the Chubu Product Center. The unusually hot summer in 2007 also boosted power consumption due to plant air-conditioning systems.

### Yamagata Plant No. 3 Site in which the latest air-conditioning systems have been installed



Three different types of air conditioning systems have been installed. Energy consumption can be minimized by utilizing only the type and number of air conditioning systems necessary to maintain the required temperature.

### Energy consumption (THK production sites)

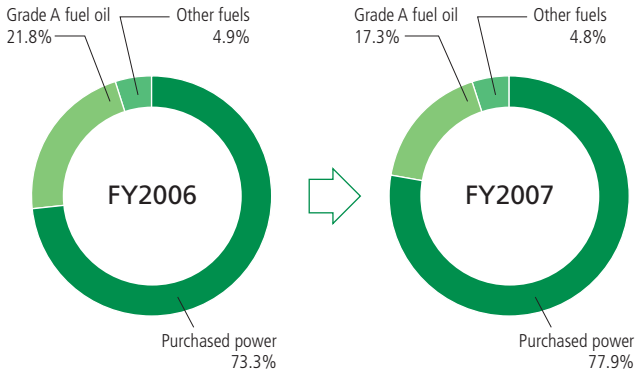


### CO<sub>2</sub> emissions





**Breakdown of the THK Group energy used**



As outlined above, the major drivers of power consumption at the THK Group production facilities are machinery fabrication, grinding and heat treatment processes and systems such as air conditioning, lighting and compressed air lines. In terms of energy sources, power purchased from utilities accounts for about 78% of consumption and Grade A fuel oil for a further 17%. The rest is derived from propane gas, other fossil fuels and liquefied natural gas (LNG). In recent years, the THK Group has tried to limit the use of Grade A fuel oil and increase the amount of purchased power to help reduce CO2 emissions.

The three main activities being undertaken by the THK Group to achieve energy conservation goals over the medium and long term are shown above, along with a list of the main measures implemented during fiscal 2007.

The THK Group is committed to redoubling efforts to achieve the emissions reduction target of 15% by fiscal 2010 relative to the fiscal 2005 benchmark, despite the lack of progress in fiscal 2007 in performance terms.

**Energy efficiency: Main items being undertaken**

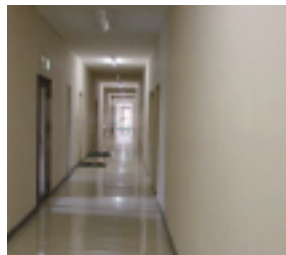
- 1 **Energy surveys**  
Analysis of the energy consumption of the buildings, machinery, air conditioning, lighting, air compressors, etc.
- 2 **Energy efficiency**  
Appropriate measures are taken based on the results of the energy surveys.
- 3 **Use of clean energy**  
We aim to increase our use of clean energy such as LNG and solar energy.

**Yamaguchi Plant No. 1 Site turbo-freezer (installed June 2007)**

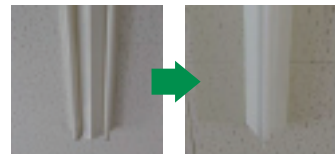


Energy consumption was reduced by replacing the grade A heavy oil-fired absorption-type hot and cold water units with turbo-powered freezers.

**Yamagata Plant No. 1 Site corridor**



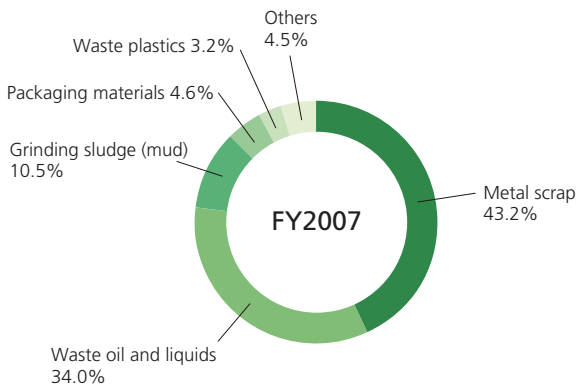
Double lights have been replaced with personnel and light sensor activated single lights, which can be switched on independently of each other.



**Main energy-saving and emissions-reduction measures (FY2007)**

- ① Operation of co-generation equipment; shorter periods of on-site power generation (switch to purchased power)
- ② Upgrade to Grade A fuel oil-fired turbo-powered freezers
- ③ Conversion to auto-off lighting fixtures and energy-efficient mercury and fluorescent lamps inside factories
- ④ Greater subdivision of switches to enable area-specific internal lighting
- ⑤ Conversion to electronic inverters for fluorescent lighting stabilizers
- ⑥ Upgrade to oil-free compressors
- ⑦ Installation of auto-off timers for ventilation system boilers

### Breakdown of waste



### Material conservation and zero emissions

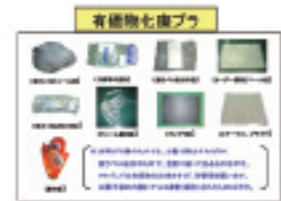
Material conservation and zero emissions activities are not merely concerned with waste management. The THK Group is also focused on developing a production set-up that is completely geared to promoting recycling.

The THK Group has adopted a just-in-time production philosophy aimed at using only the minimum material and time inputs based on careful management of materials and production process timing. This approach aims to minimize generation of waste. Just-in-time production demands maintenance of lean inventories and consistent product quality as well as advanced management techniques to enable highly sophisticated production planning and process monitoring. The THK Group strives to improve all production processes on an ongoing basis with the aim of raising production yields for raw materials and other parts.

The management of input material volumes and continual production process improvements characteristic of just-in-time production also

### Sorting table

Yamaguchi Plant waste sorting table



Mie Plant  
Sorting of resin components illustrated by photographs

### Gifu Plant waste recycling area



Production Division office



Production Division

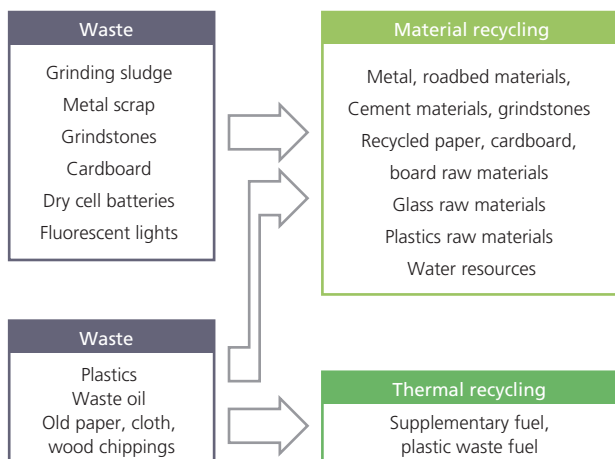
help to reduce the volume of waste generated in absolute terms. Zero-emissions activities entail promoting the comprehensive sorting and recycling of any material wastes whose emission cannot be avoided.

Wastes emitted include metal scraps, waste oils and liquids, grinding sludge, packing materials and waste plastics. The THK Group applies four principal methods to process these materials, based on their properties. Currently, most waste materials are recycled.

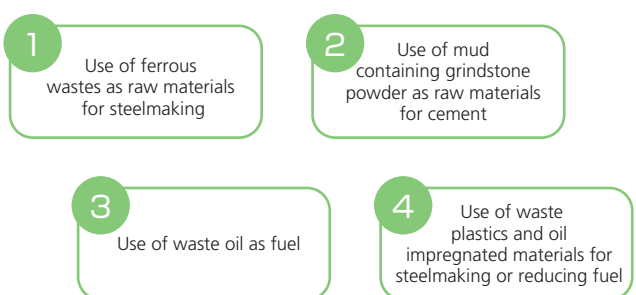
Material recycling requires wastes to be sorted in line with the ultimate use of the processed waste. The THK Group applies a detailed set of rules to sort industrial and general wastes into up to 35 separate categories. This requires the awareness and cooperation of all employees. The importance of sorting and recycling waste properly is explained in environment-related educational training courses. The THK Group also uses photograph-based sorting charts and special waste-sorting areas to make it easier for employees to do this task.

Although these various recycling activities continued in fiscal 2007, increased production translated into a rise in the total amount

### Main wastes and recycling



### Waste recycling





### Installation of grinding sludge solidification plant in Kofu Plant



Grinding sludge is solidified, and waste converted into steel materials (valuable item)

### Gifu Plant



Cleaning activities at Sasaoyama, a registered tourist spot as the site of the Battle of Sekigahara (October 2007)

#### Main zero-emissions measures (FY2007)

- ① Higher production yields for raw materials due to process improvements
- ② Reduced use of consumable items due to operational improvements
- ③ Reduced emissions of general waste due to enhanced visibility
- ④ Recycling of irrigation fluids
- ⑤ Conversion of metal scrap into saleable commodities
- ⑥ Installation of sludge solidification equipment
- ⑦ Improved operating environment in terms of dust, soot, and particulates

of waste generated of over 1,000 tonnes compared with the previous year. However, due to successful efforts to increase the proportion of wastes that were recycled, the emission ratio (the amount of waste sent to landfill for disposal as a proportion of total wastes generated) fell by 0.8 percentage points to 3.9%, an improvement of around 22% in year-on-year terms (see Figure 2).

The THK Group is targeting the achievement of zero emissions (defined as an emission ratio of 0.5% or less) in fiscal 2010.

#### Green procurement

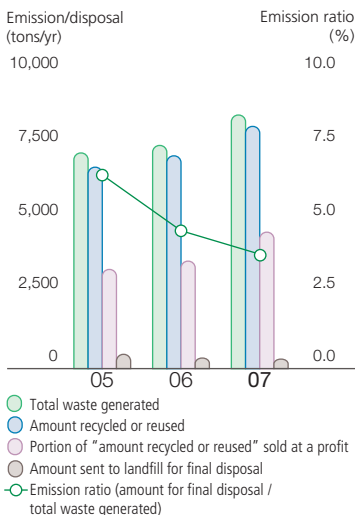
The THK Group manages chemical substances that could have a detrimental effect on human health or natural ecosystems with the aim of reducing the associated environmental impact. The THK Group's activities are designed to ensure full compliance with relevant environmental laws and regulations that apply to such "environmental risk substances."

The THK Group's green procurement program aims to support production of environmentally friendly products ("Green Products") that do not contain any of a group of 16 substances whose use is

prohibited. The THK Group Green Procurement Guidelines specify permitted content ratios for these particular substances in Green Products.

Green procurement is ordinarily defined as "the procurement of products with low environmental impact from suppliers actively involved in environmental preservation activities." In its green procurement program, the THK Group takes into consideration (1) the environmental impact of those products, parts and materials purchased at all stages, from production and distribution of raw materials to usage and disposal, and (2) the extent to which a supplier is trying to reduce the environmental impact of procured items through active involvement in environmental preservation activities. The THK Group has traditionally assessed suppliers such as upstream raw material producers, parts makers and any fabrication subcontractors on a "QCDE" (quality, cost, delivery, environment) basis. Green procurement increases the emphasis placed on the environmental aspects of the cooperative business relationship. The THK Group is working to develop an environmental quality system with suppliers as part of efforts to promote

#### Waste emissions and recycling



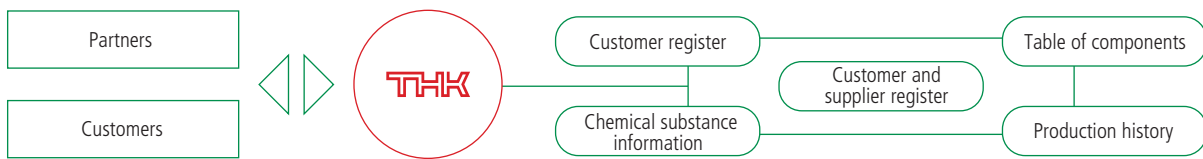
#### Substances whose use is prohibited in the THK Group

Broad classification	Substance group name
Heavy metals and their compounds	Cadmium and its compounds
	Lead and its compounds
	Mercury and its compounds
Organic tin compounds	Hexavalent chromium compounds
	Bis(tri-n-butyltin) oxide (TBTO)
Organic bromine Compounds	Tributyl tins (TBTs), triphenyl tins (TPTs)
	Polybromide biphenyl (PBB)
Organic halogen compounds	Polybromide diphenyl ether (PBDE)
	Polychloride biphenyl (PCB) / polychloride terphenyls (including their substitutes)
	Polychloride naphthalene (PCN)
Others	Chlorinated paraffin (CP)
	Asbestos
	Azo compounds (having the potential to generate specific amines)
	2,4,6-tri-tert-butylphenol

## Green products



## Working with customers and business partners



ongoing mutual prosperity.

After formulating a set of green procurement guidelines along with internal standards applicable to controlled chemical substances in 2004, the THK Group has asked its network of suppliers to (1) analyze and survey the usage of such substances in all products supplied, and to (2) introduce and develop environmental management systems (EMS). Working with suppliers over the past few years, the THK Group has implemented programs to introduce substitutes for a number of harmful substances, including lead compounds added to some plastic components, chromium (VI) compounds contained in surface coating films and cadmium compounds contained in zinc alloys. These efforts have ensured that THK Group products contain no “environmental risk substances” (to the tolerances specified in the THK Group Green Procurement Guidelines).

As the result of green procurement efforts, as of April 2006, almost 100% of the standard specification products shipped from the THK Group factories were compliant with internal requirements for Green Products.

The THK Group organizes the information that is collected on substances through green procurement activities in a controlled chemical substances database to centralize data on the various amounts of chemical substances contained in the THK Group products. This information is used to answer customer inquiries.



THK Group Internal Standards Applicable to Controlled Chemical Substances



THK Group Green procurement guidelines

### Green procurement guidelines (overview)

1. No inclusion of prohibited substances (within specified tolerances)
2. Any inclusion of environmental risk substances as stipulated in THK Group's standards for controlled chemical substances specified, along with corresponding content values
3. Minimal water/soil/air pollutant emissions or pollution due to bad odors, noise, or vibration during usage or disposal
4. Effective use of resources in terms of efforts to reduce consumption while promoting recycling, recyclability and energy efficiency
5. Conditions (1), (3) and (4) above also satisfied for packing materials used in transport or storage of parts and materials