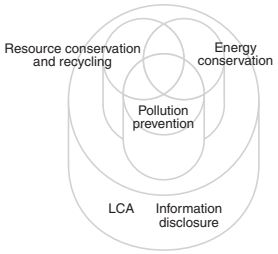
Environmental Technologies and Products Development

Providing customers with user-friendly and eco-friendly products

The development of environmental technologies is one of the most important activities in the promotion of sustainable management. In order to contribute to society by reducing the environmental impact of its products and ensure profitability by marketing products with less environmental impact, the Ricoh Group needs to develop user-friendly environmental technologies that will be accepted by more consumers. To market products that have less environmental impact throughout their life cycles, from manufacturing and use to recycling, each division is engaged in the development of new environmental technologies, and through LCA* reduce the environmental impact of products from the following three aspects: energy conservation, resource conservation and recycling, and pollution prevention.

* LCA, or life cycle assessment, quantifies the environmental impact of products from the procurement of materials to manufacturing, transportation, marketing, use, maintenance, collection, recycling, and disposal. LCA can target the whole process or only a part of it.

* See page 16, for the development of products with high environmental performance based on LCA.



■ Development of Environmental Technologies

To provide customers with products that enable them to reduce their environmental impact simply by choosing to use them, it is necessary to develop underlying environmental technologies. In April 2002, Ricoh established the Environmental Technology R&D Center as a division to drive environmental technologies and improve sustainable management. The center is committed to dramatically improve Ricoh's resource and environmental efficiency and create unique values to be provided to the public. Specifically, the center makes medium- and long-term technological development plans in the following four areas: reduction in paper use in printing/copying, energy conservation, resource conservation and recycling, and pollution prevention.

● Reduction in Paper Use in Printing/Copying

To help our customers reduce the use of paper in printing/copying, we promote the development and practical use of rewritable paper* and electronic paper. In this area, we are developing new technologies that would reduce the use of paper or use paper in a way that causes less environmental impact.

* See page 40.

● Energy Conservation

To further conserve energy in the office equipment domain, which is one of the Ricoh Group's existing business domains, we are promoting the development of technologies that do not require the use of energy and technologies for the efficient use of energy. Also, as a new business domain, research is conducted for the development of new energy technologies, including fuel cells.

● Resource Conservation and Recycling

Research is also conducted on the 3Rs* (reduce, reuse, and recycling) of products. To promote reduce design in products, medium- and long-term plans are made to prolong the life of products. Under the medium-term plan that ends fiscal 2010, the focus is placed on the establishment of a production system that recirculates resources. This system facilitates the reuse of products by introducing a platform and module design*.

* See page 41.

● Pollution Prevention

In the area of pollution prevention, technological research is being conducted under the following two themes: the complete suspension of polyvinyl chloride (PVC) use and improving the office environment by reducing the dust and noise office equipment emits when in use.

■ Quantification of Environmental Impact and Disclosure of Relevant Information

The Ricoh Group conducts research on LCA to quantify the environmental impact of products throughout their life cycles and develop products with higher environmental performance based on the quantified data. Also, we actively disclose relevant data through Type I Environmental Labels, Type II Environmental Labels, and Type III Environmental Declaration. In the industry, the Ricoh Group is a leader in the establishment of criteria for Environmental Labels and the timely and reliable disclosure of relevant information.

LCA Research

The LCA Group, which was founded by Ricoh in 1994, conducts research on practical methods of utilizing LCA. In conducting various field surveys, the LCA Group discovered the importance of setting clear goals when using LCA and found it difficult to collect data and set appropriate assessment criteria. The know-how obtained by the LCA Group is effectively utilized in the use of LCA by Ricoh Group companies and manufacturing subsidiaries. Also, to contribute to the devel-

opment of LCA Ricoh participates in external committees to conduct joint research on LCA with scholars and representatives from other companies. In fiscal 2002, the Company did an LCA for the imagio Neo 220 and imagio MF4570RC and MF3570 RC (reconditioned digital copiers) and disclosed the results on its Web site* and in product brochures. The Company also uses LCA as a method of examining technological themes.

* http://www.ricoh.co.jp/ecology/e-/label/type3/index.html

Type I Environmental Labels

Type I environmental labels have been established in countries and regions pursuant to ISO 14024 standards. These labels, which are placed on products and shown in brochures, help customers decide which product to buy. Such labels include the Eco Mark (Japan), Blue Angel Mark (Germany), Environmental Choice Program (ECP) (Canada), and Green Label (Thailand). Ricoh's criteria for product design used to promote global green marketing are severer than those set by the international Type I environmental label. Moreover, the Company actively contributes to establishing Type I environmental label criteria in various countries. In Thailand, Ricoh Thailand Limited was the first company to obtain Green Label certification for the Aficio 1022 (imagio Neo 220) copier in September 2002. Ricoh plans to obtain Type I environmental label certification for all its digital copiers.

Type II Environmental Labels

Type II environmental labels are given to products that satisfy standards independently set by each company. The Ricoh Group set its own standards for recyclable designs, the reuse rate of parts, and environmental safety. The Group established the Recycle Label and, as of March 2003, has given it to the Spirio 5000RM, Spirio 7210RM series, Spirio 8210RM, Spirio 105BB, imagio MF6550RC, imagio MF3570RC, and imagio MF4570RC.

* The imagio MF6550RC, imagio MF3570RC, and imagio MF4570RC are available only for rent in Japan.

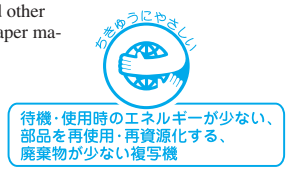
International Environment Labels for Which the Ricoh Group Qualifies

http://www.ricoh.co.jp/ecology/e-/label/type1/index.html

* Type I Environment Labels

● Eco Mark*/Japan

The Eco Mark is a labeling system that the Japan Environment Association uses. Ricoh was awarded this mark for its copiers, printers, and office paper and other printed paper materials.



An example of the Eco Mark on an imagio Neo 220/270 series model (certification no. 01117005)

● Blue Angel Mark* (BAM)/Germany

BAM certification standards are specified in detail by the German Federal Environment Agency throughout the production process, from manufacturing to the disposal of applicable products. Ricoh's facsimiles, copiers, and printers are all BAM certified.

● Environmental Choice Program (ECP) Mark*/Canada

ECP is a national program established in Canada in 1995 and operated by a private company called Terra Choice Environmental Services Inc. Ricoh's facsimiles, copiers, and printers are certified under this mark.

● Green Label*/Thailand

Green Label was launched jointly by the Thailand Environment Institute and the Ministry of Industry in August 1994. Ricoh's copiers were awarded this label in September 2002 for the first time in the industry.

● International Energy Star Mark/ Japan, the United States, Europe, etc.

Only products with power consumption below a certain level while in standby mode can be sold with the International Energy Star Mark. Almost all of Ricoh Group's applicable products have been awarded this mark.

● Energy Efficiency Labeling Scheme (EELS)/Hong Kong

EELS is a labeling scheme that certifies energy efficiency. Only machines that satisfy the energy conservation standards established by the Hong Kong government are allowed to have the label placed on them. Ricoh has been granted the use of this label since September 2002.

● Criteria for the Ricoh Recycle Label (Summary)

Newly Manufactured Machines

1. The product satisfies Ricoh's recyclable design standards.
2. Reused* parts account for 40% or more of the product's mass (mass ratio).
3. Toner cartridges used in the product are recyclable, and a system for recycling them has been established.
4. A system for collecting and processing used products as well as collecting used cartridges and containers has been established.
5. At least 90% of the product's mass (mass ratio) can be recovered and recycled in Ricoh's recycling system.
6. Consideration is given to environmental safety, as stipulated in Ricoh's standards.

* Reuse means to use something for the same purpose in its original form.
Reuse rate (%) = Maximum mass of parts reused/mass of products in which reused parts are used

Reconditioned Machines

1. Reused parts account for 80% or more of the product's mass (mass ratio).

Type III Environmental Declaration

A worldwide trend in green purchasing is the growing importance of timely and global information disclosure so that consumers can choose products and the Ricoh Group can improve its sustainable management. The Ricoh Group, following Type III Environmental Declaration, quantifies the environmental impact of products through LCA and discloses the information globally. In addition, the Ricoh Group is making efforts to promote Type III Environmental Declaration.

● Timely Disclosure of Reliable Information

Ricoh, following its participation in the Japan Environmental Management Association for Industry's (JEMAI's) initial environmental labeling program, aggressively participates in the association's subsequent EcoLeaf environmental labeling program, which started in April 2002.

In September 2002, Ricoh was granted a System Certification by a system auditor qualified by JEMAI for the Company's copiers and laser printers and quickly disclosed the environmental impact information concerning the Aficio 1022 (imagio Neo 220) digital copier and the Aficio AP 3200 (IPSiO NX810) laser printer. Likewise, Tohoku Ricoh Co., Ltd., disclosed information about the environmental impact of the Priport N500 digital copier. The information was independently verified and certified under the EcoLeaf labeling program. Under the Environment Product Declaration (EPD) program implemented in Sweden, the environmental impact information of the Aficio 650 (imagio MF6550) and Aficio FAX5000L (RIFAX ML4500) was registered and disclosed through an independent third-party certification by BVQI. Thus, Ricoh is aggressively conducting activities that would disclose more reliable information.

● Contributing to Global Compliance with Environmental Criteria

In February 2002, Ricoh made a draft standard for a Type III Environmental Declaration management system based on ISO 9001 standards and the EcoLeaf environmental labeling program. The draft standard will be applied to management systems to follow Type III Environmental Declaration, the quality of which should be assured by an appropriate certification body. To check the effectiveness of a system established according to the standard, Ricoh asked an international certification body to do the verification on a trial basis. Based on the results, the Ricoh Company will disclose the environmental impact information on more products and make proposals to international certification system-related bodies in order to contribute to global compliance with environmental criteria.

LCA Information on the Aficio1045 (imagio Neo 450) (Type III Environmental Declaration)

Product Classification	Multifunctional copier equipped with electrostatic copier, facsimile, and other functions	Product Name	Aficio 1045				
PSR-No	PSR-001	Weight of Product (kg)	78.0	Weight of Packaging, etc. (kg)	11.73	Total Weight (kg)	89.7

	Input and Output Items \ Stage of Product's Life Cycle		Unit	Preliminary Process	Manufacturing		Transportation	Use: Preliminary Process	Use: Manufacturing of Supplies		Use: User		Maintenance		Recycling and Disposal
Input	Energy resources	Electric power	MJ	46884	75.3		—	2139	645		1659		1952		20.6
		Fossil fuel	MJ		93.4		159		202		0				—
	Water resources	Tap water	m³	—	0.309		—	—	0		0		—		—
		Industrial water	m³	—	0.0675		—	—	0		0		—		—
		Underground water	m³	—	0.0835		—	—	0.664		0		—		—
	Resource input into products		kg	—	Iron and iron alloys	44.2	0	—	—		Copy paper	4072	Maintenance parts	0.835	—
					Copper and copper alloys	0.817					Toner	23.5			
					Aluminum and aluminum alloys	0.609					Photosensitive materials	0.817			
					Other metals	2.88					Developer	1.50			
					Plastic	26.0					Packaging and others	8.18			
					Glass	3.05									
					Rubber	0.382									
					Wood	0									
					Paper	9.80									
					Electronic parts	2.02									
	Chemical substances		g	—	204		0	—	513		0		—		—
Output	Emissions into air	CO_2 (electric power/other)	kg	3771	7.96	5.60	12.2	317	68.3	10.3	175		4.06		2.18
		SOx (electric power/other)	g	60740	4.70	0.0715	14.6	646	40.3	0.00	104		21.7		1.29
		NOx (electric power/other)	g	4224	5.64	4.16	37.5	202	48.4	9.1	124		5.05		1.55
		Chemical substances	g	—	7.96		0	—	405.4		0		—		—
	Emissions into water	BOD	g	18120	0.0607		0	3376	0.364		0		15.4		—
		COD	g	12166	0		0	3098	0		0		27.5		—
		Chemical substances	g	—	0		0	—	0		0		—		—
	Emissions into soil	Product: Recycled	kg	—	0		10.7	—	—		11.2		—		74.1
		Product: Waste	kg	—	0		0.0700	—	—		0.0661		—		3.90
		Site: Recycled	kg	—	0.621		0	—	3.21		—		—		—
		Site: Final disposal	kg	—	0		0	—	0		—		—		—

How the above data is shown:

1. In principle, numerical data is shown in more than three digits consisting of numbers other than 0.
2. "0" is shown when data is calculated or estimated as 0.
3. "—" is shown when data cannot be calculated or estimated.