

Creating Super Green Products

In addition to a certification system for Green Products and Green Seal Products based on in-house guidelines, starting fiscal 2004 we are developing Super Green Products, which must meet even stricter in-house standards. We are also boosting development of environmentally conscious devices based on our Green Device Guidelines and aiming to eliminate the use of the six harmful substances covered by the European Union's RoHS (Restrictions on the use of certain Hazardous Substances) directive.

Objectives for Fiscal 2003	Achievements	Objectives for Fiscal 2004	Objectives for Fiscal 2006
<ul style="list-style-type: none"> Release 100 models of Green Seal Products and make them account for 50% of total net sales Establish the New Sharp Green Seal Certification System 	<ul style="list-style-type: none"> Released 145 models of Green Seal Products; accounted for 54% of total net sales Introduced a new certification system for products sold in fiscal 2004 	<ul style="list-style-type: none"> Make Green Seal Products account for 55% of total net sales Make Super Green Products account for 10% of total net sales 	<ul style="list-style-type: none"> Make Super Green Products account for 30% of total net sales

From Green Products to Super Green Products

The Sharp Group develops Green Products based on concepts such as energy savings, safety and resource savings. In order to create environmentally conscious Green Products in all product categories, we established the Green Product Guidelines. In fiscal 1999, design and production sites in Japan and overseas began introducing these guidelines into their new product development.

We have also been steadily introducing Green Products that offer particularly high levels of environmental performance and that we certify as Green Seal Products. Green Seal Product certification standards are revised and upgraded every year. Furthermore, from fiscal 2004 we are introducing what we call Super Green Products: products that surpass stricter-than-ever in-house standards and that are extremely environmentally conscious.

Development and Assessment of Green Products

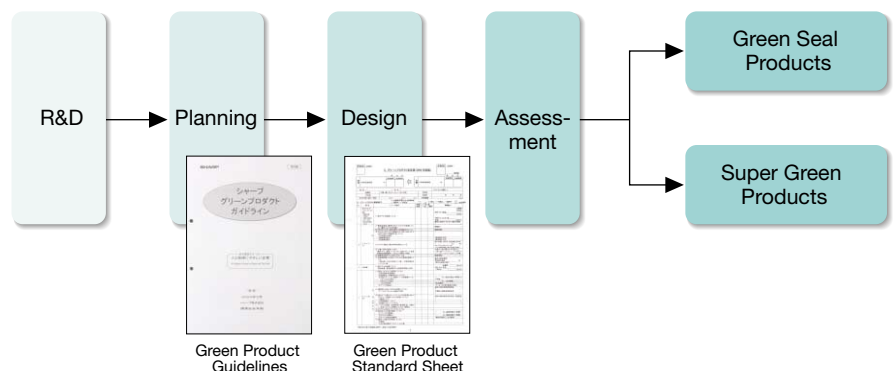
The first step in developing Green Products is the planning stage, where we use the Green Product Guidelines to design a product that is environmentally conscious in every aspect. Next, in the design stage, we design a product with specific objectives following the assessment items in the Green Product Standard Sheet. Finally, in the prototype building and mass production stages, we

determine how well the actual product has met the objectives we set for it.

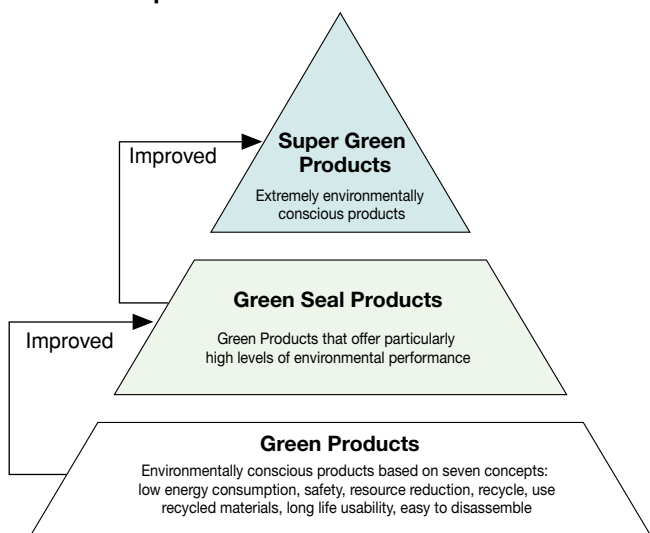
In fiscal 2003, Green Products had to satisfy at least 85% of 47 assessment items, a standard that was met by all of our new products.

For fiscal 2004, we have raised this standard to 90% in efforts to make products that are even more environmentally conscious.

Green Product development process



The Sharp concept of environmentally conscious products



Seven Green product concepts

- Low energy consumption** Products that are energy-efficient and use little energy
Design products that consume less power both in running and standby mode, and air conditioners/heaters that give more efficient cooling and heating.
- Safety** Products that are safe to use
Carry out tests on products for chemicals and work to abolish or reduce use of chemicals that have negative effects on people's health or the environment.
- Resource reduction** Products that use minimum resources
Make products that use less water and detergent, and reduce the amount of materials used in products and packaging.
- Recycle** Recyclable products
Choose materials that can be easily recycled or reused in products, and label the type of material used.
- Use recycled materials** Products made from recycled materials
Use recycled plastic and reuse parts in making products.
- Long life usability** Products with a long life cycle
Design products that are upgradeable and easy to repair.
- Easy to disassemble** Products that are easy to disassemble
Design products so that they will be easy to take apart for recycling.

Raising Assessment and Certification Standards

In fiscal 2003, Green Products that satisfied the four required items of the Environmental Performance Criteria and at least one in the External Environmental Claim Standards were certified as Green Seal Products. We certified 145 new product models as Green Seal Products.

Starting in fiscal 2004, products will be designated as Super Green Products if they pass the assessment and certification process based on newly established standards. According to the new standards, products must meet the RoHS directive and have the Japanese Eco Mark status. The new standards also have a new Environmental Performance Criteria section that covers a combination of factors including global warming, effective use of resources, and use of substitutes for toxic chemicals. Products that satisfy 90% of the assessment conditions in the new standards will be certified as Super Green Products.

We have also raised the bar for assessment and certification of Green Seal Products, which must now satisfy 70% of the assessment conditions in the Environmental Performance Criteria.

These new, strict standards will hereafter be the basis for new product development. Our goal is to have Super Green Products account for 10% of total net sales for products in Japan in fiscal 2004 and 30% in fiscal 2006.

Fiscal 2004 assessment and certification standards for Green Seal Products and Super Green Products

	Green Seal Products	Super Green Products
I Required items	<ul style="list-style-type: none"> Satisfy four required items of the Environmental Performance Criteria 	<ul style="list-style-type: none"> Satisfy four required items of the Environmental Performance Criteria Meet the RoHS directive Have Eco Mark status
II Level of environmental consciousness	<ul style="list-style-type: none"> Satisfy at least one item of the External Environmental Claim Standards 	<ul style="list-style-type: none"> Be significantly more environmentally conscious than the products of other companies
III Environmental Performance Criteria (Total score: 100)	Prevents global warming Low power consumption, high energy efficiency, etc. 20 points	Makes effective use of resources Designed for recyclability, resource saving, etc. 20 points
	Uses substitutes for toxic chemicals Uses no heavy metals, uses lead-free solder, etc. 35 points	Other Has Eco Label status, uses minimum packaging materials, etc. 25 points
	At least 70 points	At least 90 points

All conditions under sections I, II, and III must be satisfied.

Four required items of the Environmental Performance Criteria

Items	Detail
Energy saving	Less power consumption and standby power consumption when compared to previous model
3R	Easy separation and disassembly or upgradeable
Safety	Uses lead-free solder in more than one circuit board
Packaging	<ul style="list-style-type: none"> Abolishing the use of polystyrene foam (for products weighing less than 10 kg) Reduced use of plastics or amount of wrapping material when compared to previous model



Green Seal

External Environmental Claim Standards

Items	Detail
Energy saving Energy creating	Power consumption <ul style="list-style-type: none"> Industry-leading model of each product category Standby power consumption <ul style="list-style-type: none"> Industry-leading model of each product category 0.1W or less (remote controlled products) 1.0W or less (telephones, facsimiles, PCs) Energy creating <ul style="list-style-type: none"> Industry-leading conversion efficiency
3R	Resource savings during use <ul style="list-style-type: none"> Industry-leading model of each product category (saving water and detergent, etc.) Compact/lightweight <ul style="list-style-type: none"> Industry-leading model of each product category Reduced by 30% or more when compared to previous model Recycled materials <ul style="list-style-type: none"> Use of recycled materials (material recycling)
Safety	Green materials <ul style="list-style-type: none"> Abolishing use of halogen-based flame retardants, substituting polyvinyl chloride Use of refrigerant with low global warming coefficient Use of lead-free solder in all circuit boards Abolishing the use of heavy metals (lead, mercury, hexavalent chromium, cadmium)
Eco Mark	Acquired Eco Mark <ul style="list-style-type: none"> Acquired Eco Mark authorized by the Japan Environment Association
Others	Original technology <ul style="list-style-type: none"> Sharp technology, the environmental consciousness of which can be evaluated objectively

Planning and Design: The Environmental Accounting View

Environmental conservation activities	Environmental conservation costs (Units: ¥million)	
	Investment	Cost
R&D, planning and design of products contributing to environmental conservation	—	3,908
R&D, planning and design to reduce environmental burden during manufacturing processes	—	609
Total	—	4,518

Our research and development is aimed at reducing the environmental burden of the products themselves and of manufacturing processes. In fiscal 2003, we invested approximately 4.5 billion yen in research, development, planning and design. The aim was to create products that contribute to environmental conservation and develop manufacturing processes that

Environmental conservation effects	
Green Seal Products as % of total net sales	54%
CO ₂ emission control effect through energy-saving design/development	62,603t-CO ₂
Waste reduced through easy-to-recycle design	38,117t
Recycled plastic used in new products	270t
% of new products using lead-free solder*	82%

* New products in Japan

minimize environmental burden. As a result, Green Seal Products accounted for 54% of total net sales, 270 tons of recycled plastic was used in new products, and 82% of new products in Japan used lead-free solder. In fiscal 2004, we will continue research and development aimed at reducing the environmental burden of our business activities.

Creating Super Green Products

Developing Green Devices

As in the example of the LCD TV, the Sharp Group's spiral strategy leads the development of proprietary devices that form the foundation for a range of unique, one-of-a-kind products.

To create highly environmentally conscious Super Green Products, we will need to develop "green devices." This will require us to accelerate the pace and raise the technological level of development. That's why we established the Green Device Guidelines, which detail standards and assessment methods for developing environmentally conscious devices. In April 2004, we began introducing these guidelines into all device groups in Japan. These guidelines will allow us to achieve specific target values in device development and thus create Super Green Devices that offer the highest level of environmental consciousness.

Green Purchasing and Eliminating the Six Harmful Substances

In fiscal 2000, the Sharp Group established company-wide Green Purchasing Guidelines, thereby cooperating with our suppliers of parts and materials to make environmentally conscious products. There are two categories of assessment under these guidelines: Assessment of Environmental Management for determining whether the supplier's entire organization is working to protect the environment based on standards like ISO 14001; and Assessment of Delivered Goods for determining the environmental burden of parts and materials purchased from the supplier (in particular, whether the parts or materials contain environmentally harmful substances). This comprehensive assessment allows us to determine how environmentally conscious the supplier is.

In fiscal 2003, we carried out surveys on the chemical substances contained in parts and materials using survey tools and measuring relevant survey substances as determined by the Japan Green Procurement Survey Standardization Initiative*. We have begun work on eliminating use of the six harmful substances covered by the EU RoHS directive, which is set to go into effect in July 2006 in Europe.

We will step up these efforts in fiscal 2004 with the goal of replacing harmful substances in products with safer substitutes.

* A council consisting of 3 organizations and 70 companies, mainly electronic manufacturers, including Sharp Corporation, which works to standardize research on chemical substances contained in parts and materials.

The Green Device concept

Energy saving

Reduce total power consumption and reduce power consumed in standby mode compared to previous models

Recyclability

Use standard plastic, or use materials that are easy to separate and disassemble (LCD devices)

Resource saving

Reduce device weight or volume compared to previous models

Green materials

Use no RoHS-designated substances or substances designated as banned under Sharp standards

Long life

Extend the life of the product with exchangeable parts and consumables (LCD devices)

Packaging

Reduce packaging materials

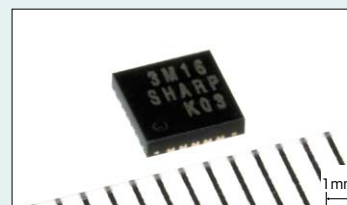
Information disclosure

Provide information on chemical substances contained in devices

Device Example

Compact, Low-Power-Consumption System Power Supply IC

In June 2003, we developed a system power supply IC for LCD drivers used in mobile electronic equipment. The power for TFT LCD drivers, which used to be supplied by multiple chips, can now be supplied with this small, single-chip device. This system power supply IC reduces power consumed by mobile phones while talking and in standby mode and increases the phone's battery time in standby mode by approximately 15% (compared to Sharp's previous models).



System power supply IC for LCD drivers used in mobile electronic equipment

Green purchasing assessment items

Main criteria for Assessment of Environmental Management

- (1) Comply with ISO 14001 or EMAS*
- (2) Carry out activities related to environmental conservation: corporate creed, policy, objectives, organization, education and training
- (3) Organize a system for green purchasing to procure parts and materials
- (4) Publicly disclose details and results of environmental conservation activities
- (5) Provide an MSDS (material safety data sheet) upon delivery of chemicals

Main criteria for Assessment of Delivered Goods

In order to ensure the elimination of harmful substances, goods must not contain the following substances, which Sharp has banned in products.

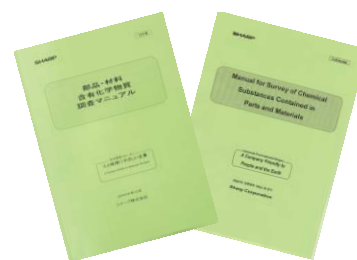
- (1) Substances prohibited under the laws and regulations of Japan and other countries, as well as substances expected to be prohibited in future
- (2) Substances restricted under voluntary standards, such as environmental labeling standards, in Japan and other countries, as well as substances expected to be restricted in future
- (3) Substances banned under Sharp voluntary standards
- (4) Substances whose use is restricted in the manufacturing process under laws and regulations and voluntary standards in Japan and other countries, as well as substances expected to be restricted in future



Meeting to explain Green Purchasing in Indonesia



Meeting to explain Green Purchasing in Spain



Survey Manual for Chemical Substances in Parts and Materials (Japanese and English editions)

* Eco-Management and Audit Scheme: the environmental management system and auditing rules in the EU.

Product Examples

AR-266 Series Digital Multifunction Systems

The AR-266 Series Digital Multifunction Systems have two levels of power: Main and Sub. By using Sub power when the product is not in use, you can reduce power consumed in standby mode*1 to less than one watt*2. The energy consumption efficiency*3 is approximately 27%—less than 21.44 Wh/h—that of our previous models, making the AR-266 Series the most energy efficient products in their class*4. It's these qualities that earned the AR-266 the Energy Conservation Center Chairman's Prize in the 2003 14th Energy Conservation Awards (Energy Conservation Equipment and Systems Commendations) sponsored by the Energy Conservation Center.

- *1 In Auto Power Shut Off mode, which automatically lowers power to the machine after it sits idle for a set period of time.
- *2 Three models: AR-266G, AR-266FG and AR-266S.
- *3 Under provisions of the Energy Conservation Law. A measurement of the power consumed during a certain idle period after the machine has made a certain number of copies. The lower this figure, the greater the energy consumption efficiency.
- *4 According to a survey by the Green Purchasing Network (GPN) Web site (current as of August 28, 2003, for 26-ppm and faster machines).



AQUOS LCD TV

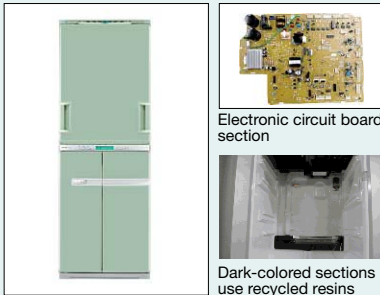
The 32V-inch model of the AQUOS LCD TV consumes approximately 24% less power than an equivalent-sized CRT TV. The backlight has a life of approximately 60,000 hours and can be replaced for even longer years of AQUOS use.

The cabinet is made with non-halogen resin, which releases almost no dioxins when incinerated, while the speaker enclosures use easy-to-recycle aluminum. But that's not all. The AQUOS is environmentally conscious through and through: the stand and speakers are made of recycled plastic, the main printed circuit boards use lead-free solder and the power cord uses no vinyl chloride.

The SJ-PV43H Energy-Saving Refrigerator

The SJ-PV43H employs a variety of energy-saving technologies to achieve power consumption of just 190 kWh/year (221% achievement rate of 2004 energy conservation standards). This is approximately 30% less than the 270 kWh/year consumed by our previous model, the SJ-PV43G. There are also power-saving functions that adapt to how the refrigerator is used: a function that saves 10% on electricity when the user is out of the home for extended periods of time, and a function that saves 3% during the night.

The SJ-PV43H uses the non-CFC refrigerant R-600a, meaning an ozone depletion coefficient of zero and a global warming coefficient just 1/400th of conventional CFC substitutes. The refrigerator is made without specified bromine-based flame retardants, using only environmentally conscious materials like non-vinyl chloride materials, lead-free solder circuit boards, lead-free wiring and recycled plastic.



Electronic circuit board section

Dark-colored sections use recycled resins

NT-167AK Single-Crystalline Photovoltaic Module

In April 2003, Sharp released a photovoltaic module*1 that achieves 3 kW*2 of power generation with the industry's smallest surface area*3. While Sharp's previous model required 23.1 m² of installation space, this new system requires just 17.3 m², allowing smaller houses to install and enjoy the benefits of a photovoltaic power generation system.

High-efficiency technology allows the NT-167AK to achieve a 17.4% module conversion efficiency, the world's highest*4.

- *1 A module is a packaged array of the necessary number of solar batteries and cells covered in reinforced glass to withstand use outdoors.
- *2 3 kW is equivalent to 72% of the power consumption of an average household.
- *3 Current as of April 21, 2003, for terrestrial, mass-produced photovoltaic modules.
- *4 According to a Sharp comparison of information on the Web sites of 31 companies, including the top 11 in terms of production volume, accounting for 91.8% of the world market share (as listed in PV News) (November 2003 survey).



The Environmentally Conscious AQUOS

- ① Lead-free solder circuit board
- ② Chassis frame using 50% recycled material
- ③ No lead or vinyl chloride in power cord
- ④ No hexavalent chromium in fasteners (bolts, nuts)
- ⑤ No lead or vinyl chloride in inner cables
- ⑥ Chrome-free sheet steel (backlight frame)
- ⑦ Non-halogen cabinet
- ⑧ Speaker grill using 20% recycled material



Mobile Phone Stands Adopt Material Recycling Technology

Using material recycling technology, Sharp began in September 2003 to ship mobile phone stands (for the SH252i model) that use recycled ABS resin. By collecting used mobile phone stands and recycling the materials in them—for use in new mobile phone stands—we can reduce CO₂ emissions from our business activities by 112 t/year (equivalent to the amount of CO₂ absorbed by 160 trees in one year)*.

* A trial calculation based on collecting and recycling 5% (500 t/year) of the mobile phone stands shipped in one year.

