

Environmentally Conscious Products

In product development and design, it is important to evaluate environmental impact caused by all stages in the process flow from procurement of materials to disposal. Olympus operates product assessment to encourage development of products reflecting Environmental Awareness.

Environmentally Conscious Design

In 1992, Olympus organized an environment activity committee and started environment improvement for product packing and distribution. In 1997, it started product assessment to enhance product recycling. The concept was set out in an Olympus Product Assessment Guide in 1999 detailing the corporate position on energy saving of products and resource saving design.

As a critical implementation of the 02 Environment Basic Plan, Olympus reviewed chemicals control and Green Procurement, the introduction of LCA (Life Cycle Assessment) technology and establishment of an Olympus Eco-product Standard, a new Eco-products Standards in FY2003 to enhance environmental-conscious design.

Elimination of Hazardous Substances to ensure Environmental Protection and Security

A variety of chemicals is used in components and materials that make up products to ensure function, performance, and quality. To maximize safety ensuring that customers use Olympus products without worry and also to maximize safety during manufacture and minimize environmental burden of waste products, Olympus has promoted the elimination of hazardous substances contained in products and dangerous materials used in manufacture by gathering safety information on different chemicals in advance, and by anticipating laws and regulations. Lead-free production processes have been instilled and products using the technology will be produced in FY2004. We are promoting product-related measures that ensure environmental protection and security through substitution with safe chemicals such as adoption of lead-free lenses, elimination of PVC, use of low-toxicity rinsing antiseptic solution for medical services equipment, elimination of mercury, and adoption of application technology such as use of Trivalent Chromium Plating Baths and Powder Painting in products and manufacture.

In FY2003, we reviewed guidelines for the use of conventional chemicals and established standards over all Olympus products design, manufacture, and procurement into Olympus Environment-Related Substance Management Standards. The above concepts are reflected in the newly established Olympus Eco-products standards for practical operation.

Fiscal Year	Main Activities
1993	Olympus Environmental Principles was established. Company-wide environmental protection organization was reviewed. Products environment activity committee was set up to start product packaging and distribution improvement.
1997	The Company-wide 96 Environment Basic Plan was formulated. Company-wide environment manual was established.
1998	The Ina Plant obtained the first ISO 14001 Certification for the Olympus group. Product Environmental Assessment started.
2000	The company-wide 99 Environment Basic Plan was formulated. OISR Product Environmental Assessment Guideline was established.
2001	Green Procurement System was introduced. Research of Green Procurement started. Olympus Chemical Use Guideline was established.
2003	The Company-wide 02 Environment Basic Plan was formulated. Olympus eco-products standard was formulated. Product Environmental Assessment was reviewed. Olympus Chemical Use Guideline was reviewed. Olympus Environment-Related Substance Management Standards were established. Green procurement research was reviewed. New green procurement research was implemented in trial. LCA technology was introduced and implemented in trial.

■ Progress of the Environment Activities and Construction of Environment Design

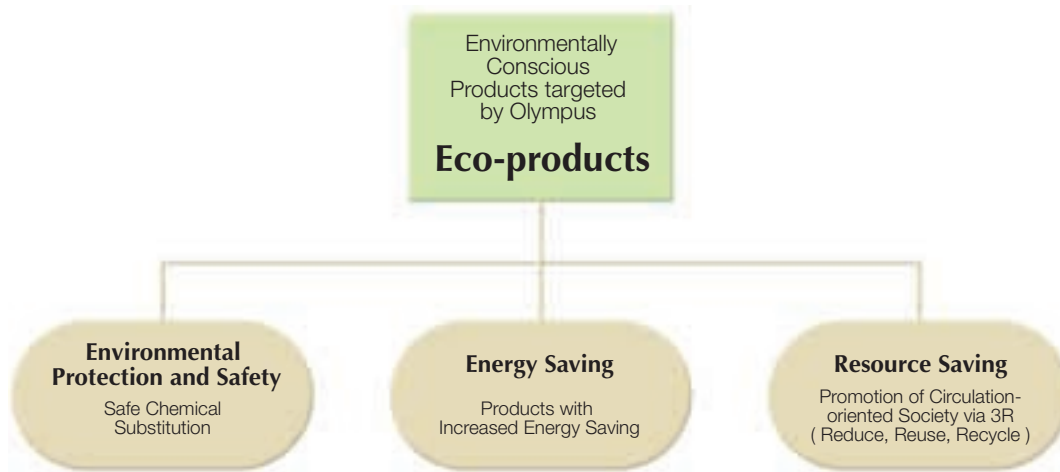
Division	Substances Contained in Products	Substances Used in Production Processes
Prohibited	<p>Must not be contained in Products</p> <p>Nine Substance Groups</p> <p>Cadmium Compounds Organotin Compounds Specified bromine-based fire Retardant Ozone layer depleting substances, etc.</p>	<p>Must not be used in Production Process</p> <p>30 Substance Groups</p> <p>Substances specified or regulated by Ozone Layer Protection Law Prohibited substances for prevention of soil and ground Water Contamination Dust specified by Air Pollution Control Law Class 1 Specified Chemicals by the law on the examination and regulation of manufacture, etc., of chemical substances, etc.</p>
Use Restricted	<p>Contents in products will be totally eliminated based on the Use Restriction Plan.</p> <p>Five Substance Groups</p> <p>Hexavalent chromium Compounds Lead Compounds Mercury Compounds, etc.</p>	<p>Use in Production Process will be totally eliminated based on the use restriction plan.</p> <p>Not Applicable</p>
Controlled Use	<p>Contents in products and the part in which the substance is used will be identified</p> <p>14 Substance Groups</p> <p>Arsenic Compound Beryllium Compounds Nickel Compounds Selenium Compounds, etc.</p>	<p>Situation of use during Production or Disposition inside Olympus will be recognized.</p> <p>Class 1 Substances specified by PRTR (Pollution Release and Transfer Resister) Law 354 Substances</p> <p>Excluding substances specified in the above divisions</p>

■ Standard Use of Environmental Substances

Eco-products

Setting up profile of Environmentally Conscious Products, which aims at creating new values, we started preparation for addressing creation of new Environmentally Conscious Products in FY2004 and after.

Environmentally Conscious Products targeted by Olympus



■ Schematic Diagram of Eco-Products

●Olympus Eco-product Standards

Olympus established Olympus Eco-product Standards based on “substitution with safe chemicals”, “increased energy saving products”, and “promotion of formulation of circulation-oriented society via 3R” as design standards for Environmentally Conscious Products.

Olympus Eco-product standards were formulated by setting a standard for 32 items that Olympus indentified as being suitable. Decisions were then taken as to the level of product assessment to be undertaken at all stages of planning, design, and trial manufacture of products.

●Olympus Eco-products Approval Committee

Starting from FY2004, the designation of eco-product will be given to products meeting eco-products requirements for applicable product categories, by in-house accreditation of environmentally conscious products.

A product developed based on standards for product categories and approved by a company-wide Environmental Approval Committee will be examined by the Olympus Environmental Approval Committee and approved by the Director in charge of the Environment. Once it is approved, the Olympus Eco-product will be given a mark on the products, and environmental information will be disclosed in catalogs and on the Olympus Web site.

Definition	Standard
Environmental Protection and Safety	<ul style="list-style-type: none"> Substances prohibited or use-restricted in products Enhanced Safety in use
Energy Saving	<ul style="list-style-type: none"> Reduction of power consumption when in use
Resource Saving	<ul style="list-style-type: none"> Lighter, thinner, shorter, and smaller products Ratio of improved Recyclability Discretion Collecting/Recycling Indication Resource Saving in use Resource Saving during Manufacture Longer-life Products Upgrading
Disclosure of Environmental Information	<ul style="list-style-type: none"> Environmental impact assessment / information provision

■ Olympus Eco-product Standard



Environmental Approach to Product Design

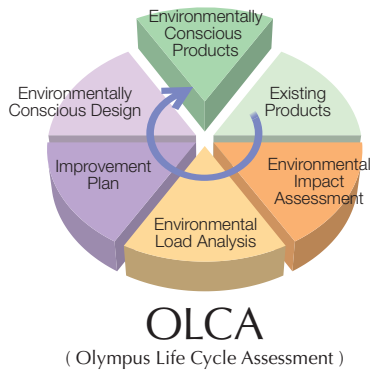
To assess environmental impact throughout product life, we will introduce of Life Cycle Assessment (LCA) technology. In FY2003, LCA was introduced company-wide as a trial for accumulating technological information.

Approach to LCA Introduction

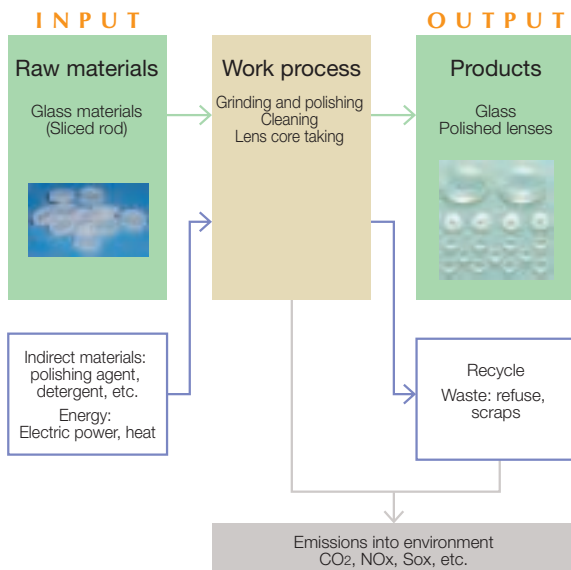
We addressed the introduction of LCA technology that objectively and quantitatively evaluates the load imposed on the environment by products to further minimize environmental load throughout the Product Life Cycle, including procurement of materials, production, distribution, use and disposition, and products design and production technology development.

We are working on introducing LCA technology capable of environmental load assessment during manufacture, which emphasizes assessment speed enabling quick feedback to product development, and which incorporates Environmental Load Unit Consumption (Life Cycle Inventory: LCI data) of major component processing and assembly in-house.

We will use LCA as an Olympus assessment system called Olympus Life Cycle Assessment (OLCA) in FY2004 and thereafter.



■ Diagram of Assessment using OLCA



■ Investigation of LCI Data in Work Process

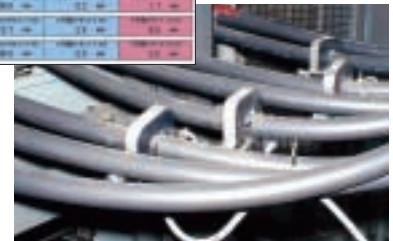
Investigation of LCI Data at Production Stage

Life Cycle Assessment at the production stage uses Energy and Resource Consumption and Environment Emission as an assessment item, and uses unit consumption by LCI data investigation of all input and output, including feed materials, raw materials, indirect materials, energy, and waste in major processes such as glass, metal, and plastics processing, surface treatment, and assembly.

We are now accumulating unit consumption data to reflect actual operation by monitoring power consumption in each major process.

Process	Power Consumption (kWh)	Water Consumption (L)	Waste Generation (kg)
Grinding	120	50	10
Polishing	150	60	12
Cleaning	80	30	8
Lens Core Taking	90	40	9
Assembly	110	45	11
Surface Treatment	130	55	13

Power Consumption Monitoring



Environmental load-measuring and evaluation tools are essential for creating eco-products and promotion of eco-management. It is necessary to integrate a process that quantifies the environmental load and promotes improvement in the task mechanism, such as when a product developer wants to reduce cost by estimating product cost or when a plant manager seeks to enhance productivity by recognizing production efficiency. To do this, we are now developing an easy-to-use LCA tool, OLCA (Olympus LCA), so all products and processes are evaluated by this tool and it becomes a measure of Environmental Management.



Masahisa Fukuda, group leader
Production Systems Clean Production
Systems Department
Production Engineering Division

Green Procurement

To ensure development and production of Environmentally Conscious Products, we are cooperating with suppliers to pursue procurement of materials and components with less environmental load based on new survey specifications of the Green Procurement Research Sharing Council.

Approach to Green Procurement

Olympus adapted Green Procurement in 2000. Since then, we have evaluated quality, price, and delivery time and approach to environmental protection of suppliers, which we used in environmental awareness at procurement. We must, however, reduce the environmental load from materials and components and effectively use resources to further promote the development of Environmentally Conscious Products. It is also imperative to abide by laws and regulations that control chemicals in products. Implementation of Green Procurement Research has become very important in reflecting information on chemicals that compose materials and components of products in product design.

We were successful in investigating environmental protection thanks to the cooperation of suppliers during two years of green procurement research. We wish to complete the investigation of materials and components.

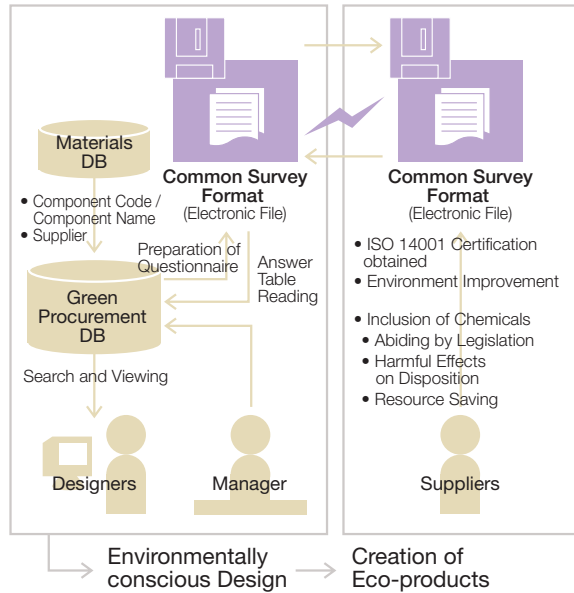


Participation into Green Procurement Research Sharing Council

We joined the Japan Green Procurement Survey Standardization Initiative (JGPSSI), a council that addresses industry standardization of Green Procurement research established by the Japan Electronics and Information Technology Industries Association (JEITA) and continues to work for new Green Procurement research sharing. Sharing of global Green Procurement research is expected to progress.



■ Questionnaire Form



■ Conceptual Diagram of new Green Procurement using Electronic Files (Supplier Evaluation and Survey of Environmental Substances)

Trial Implementation of new Green Procurement

Olympus was the first to target the trial as per council specifications. After internal briefing, we started briefing 550 domestic suppliers and 300 overseas suppliers in December 2002. We also demonstrated data entry using personal computers at some sites so suppliers could master answering and entering data.

At the trial, we conducted a survey on the level of approach to the environment of suppliers and a survey on chemicals based on council survey specifications using electronic information files.

Regular operation of new Green Procurement will start in FY2004.



Briefing of Suppliers on new Green Procurement



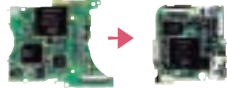
Examples of Environmentally Conscious Products

Olympus products have conventionally contributed to resource saving and waste reduction through production of more compact, lightweight items. We are committed to less power consumption of products as an important requirement for Environmentally Conscious Products.

Environmentally Consciousness in Digital Camera "CAMEDIA μ-10 DIGITAL"

Power and Resource Saving

A newly designed single-chip low-voltage-driven IC (Integrated Circuits) on the motherboard ensures high-density mounting. The lens zoom motor uses a low power consumption, high torque motor. We could realize sharp power saving when the digital camera is in service and more resource saving using a smaller motherboard.



More Compact Optical System

A triple-time zoom lens features weight and volume reduced from the conventional 8 components in 7 groups to 5 components in 3 groups. The number of lenses is substantially decreased in aspherical lens design and glass molding, which helps promote energy and resource saving in manufacture. The finder optical system is made compact to halve its size.

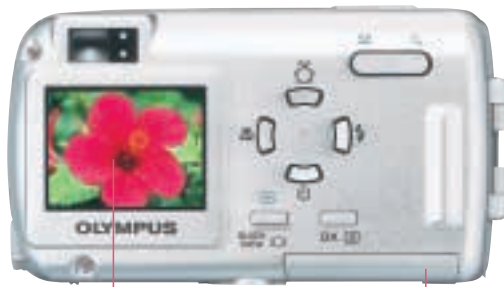


Low Power Consumption Design enabled Water Resistance in Daily Use

Low power consumption lowered heat reduction during camera use, which helped protect the image pickup device from heat, and thus enhanced level of waterproofing was possible in the Digital Camera.

Adoption of Lead-free Lens

Lead-free Glass is used in all lenses and other optical glass.



Mercury-free Liquid Crystal Backlight

The backlight source uses a white ray emission diode, which enabled us to eliminate mercury from the liquid crystal monitor.

Resource Saving by Use of Secondary Battery for Power Supply

A new lithium ion secondary battery capable of about 300 charges and discharges enabled further resource saving. As a member of JBRC (Japan Battery Recycle Center), we are promoting the collection of used batteries and more recycling.



Other Examples of Environmental Awareness

Material identifying indications are affixed to major plastics components to allow easier separation. We are working to totally eliminate Styrofoam cushioning materials, paper reduction by use of product instructions on CD-ROM, and use of recycled paper.



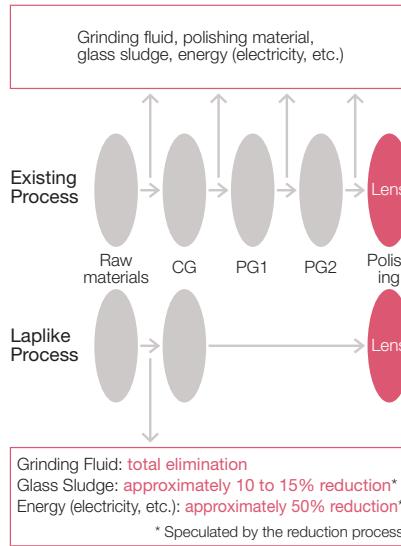
Examples of Environmental Technology Development

Olympus is committed to development of products, manufacture technology and positive introduction of application technology that minimizes the impact on the environment during the product life cycle.

Technology of standardized Lens grinding and polishing

Olympus has developed standardized grinding and polishing technology, called the “Laplike Method”, which reduces the lens grinding and polishing process and does not use grinding fluid.

It features a whetstone with diamond powder blended in its specific binding material, which causes surface electric potential in liquid. When this whetstone grinds out a lens, silica nanoparticles from the polishing fluid are absorbed by the binding material, and the lens is polished to a mean roughness of 0.03 μm or less. This eliminates downstream precision grinding. The introduction of this technology halved facility and installation space, enabled energy saving of 50% due to reduced work hours, reduced glass sludge by 15%, reduced industrial waste, and totally eliminated ethylene glycol grinding fluid.



■ Laplike Processing Mechanism and Effects

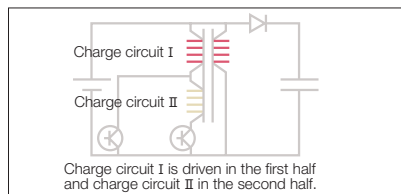


Takayuki Kishida
Ultra-precision Technology Department
Production Engineering Division

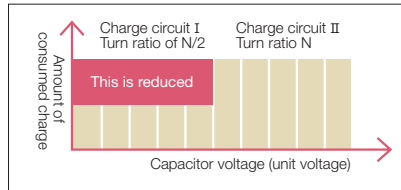
“The Laplike method was born from field needs, reforming lens manufacture methods, and I was convinced that cost reduction would reduce the environmental load.”

Energy Saving and Flash Recharging Circuit with 25% Power Consumption Reduced

Olympus’s unique energy saving flash recharging circuit design enabled us to reduce electricity consumed by a charging operation by about 25%. This technology selects charge circuits with different winding ratios based on the charge voltage and obtains capacitor voltage and charge required for light emission, minimizing current consumption of the battery. The charge circuit was also made compact, and has been used in film cameras. Due to constant improvement, a second-generation energy saving flash with a short charge time is used on new products.



■ Energy saving flash recharging



■ Electricity consumed by Battery per unit Voltage



Keiichi Tsuchida
R & D 3 Department
R & D Division Imaging Systems Group

“I would like to apply this technology to digital cameras that require much more energy saving.”

ASIC (Application Specific Integrated Circuits) for Digital Camera Power and Resource Saving

Environmental impact assessment of digital cameras by LCA showed that the energy load factor during camera operation in the total life cycle of products is high and energy saving design was thus an important issue in product development. Olympus developed an ASIC for digital cameras for quick processing and low power consumption based on high efficiency image processing and energy saving IC design. We are on the way to ultimate design for more energy and resources management resulting from reduction in size and weight when in operation.



■ Single-chip Energy Saving Motherboard



Akira Ueno
SOC Technology Department
Research and Development Division Corporate R & D Center

“I am dedicated to realizing more functional ASICs and lower power consumption to make a more power-saving, smaller digital camera. I want to apply the technology that I have acquired here to other products.”



Environmental Consciousness in Product Packaging and Distribution

Olympus is promoting reduction of materials used in product packaging, use of regenerated resources and smaller packaging to ensure reduction of the environmental load caused by product packing and distribution. The standardization of distribution bases of the Olympus Group is the next target for reducing the environmental load entailed by distribution.

Approach to Environmental Product Packaging and Distribution

In the area of product packaging, we are shifting toward materials having high packaging functions and quality, reliability, disposability, and convenience, and for which recycling infrastructures are already in place, and use of recycled materials, more adequate packaging design, and development of packaging design technology. In distribution, we are working to reduce the environmental load in the total logistic operation, including direct delivery from manufacture bases; transport packaging suitable to the change in the distribution environment due to automatic delivery sorting; and energy saving and higher efficiency through modal shifts, etc.

To improve packaging and distribution, we are now :

- Changing Materials
- Changing the Shape of Corrugated Cardboard Boxes
- Considering Recyclability
- Considering Packaging Design in Transport Environments
- Constructing Distribution taking the Environment into Consideration

Trends in Product Packaging

Since we set up a Packaging Environment Committee in fiscal 1992, we have promoted the 3Rs — Reduce, Reuse, and Recycle — for product packaging materials and seek to reduce packing volume and Styrofoam 30% in packaging design technology, which is called “Slim 30”.

We are also addressing shifts in materials to cardboard, pulp mold, and film packaging material whose recycling infrastructure is in place and promoting 3R design and i) use of recycled materials as cushioning materials to replace Styrofoam ii) exclusion of organic solvent from printing iii) surface processing and packaging design with less environmental load through LCA.



Endoscope Carrying Case made of Cardboard



MO Cushioning Material made by Pulp Molding



Film Packaging used for Microscope Cushioning Material



Water-based Ink Printing on Packaging of Analyzing Reagent