Examples of Environmentally Friendly Product Development

The entire Nikon group is implementing the “Nikon Product Assessment” to create new products which offer enhanced power consumption efficiency, are smaller and lighter, use less harmful substances, and utilise eco-glass. We believe these improvements will be most beneficial to the global environment. Here are a few examples:

Precision Equipment Company Products

● i-line scan field IC stepper NSR-SF120

This i-line stepper delivers high-performance exposure for non-critical layers of next-generation DRAMs and MRUs. It has been designed to offer superior cost performance in mix-and-match applications with lens-scanning KrF steppers, the key systems in state-of-the-art semiconductor fabrication lines. The result is superlative productivity for advanced semiconductor manufacturing lines.
Overall power consumption efficiency has been improved through enhancements in resolution, total alignment accuracy and throughput, in combination with measures to limit power consumption.
<Power consumption efficiency> Increased by 105% over the NSR-SF100 in exposure of a 300mm wafer (internal reference).
<Ozone layer protection> New HFC refrigerant with zero ODP (Ozone-Depletion Potential) used for temperature control and air conditioning chillers.
<Global warming substances> New HFE refrigerant with low global-warming potential used in equipment internal cooling.

NSR-SF120

● Liquid crystal display stepper FX-51S/61S

The development of advanced technologies by Nikon, including multilens projection optics and a scanning exposure system has made it possible to attain both the exposure area and resolution needed for 5th- and 6th-generation plate sizes, both crucial in the production of Liquid Crystal Display (LCD) panels. The FX-51S/61S offer enhanced throughput and significantly improved energy efficiency.
<Power consumption efficiency> Increased by 66% over the FX-12S for a 13.3-inch panel, and 125% over the FX-601F (internal reference).
<Ozone layer protection> New HFC refrigerant with zero ODP (Ozone-Depletion Potential) used for air conditioning.

FX-51S/61S

Imaging Company Products

1. Film-based cameras and interchangeable lenses

● Nikon F75

Compared to its predecessor, the small and lightweight Nikon F65, the F75 offers an improved range of easy-to-use functions, with space-saving design implemented from the component level to enable the creation of an even smaller, lighter 35mm SLR camera.
<Reduced product volume> 7% less than the Nikon F65
<Reduced product mass> 4% less than the Nikon F65

F75

● Lite·Touch Zoom 150ED QD

The adoption of a new single-motor design and downsized mechanisms make this camera the smallest and lightest in the world among 4x zoom compact cameras with sliding covers.
<Reduced product mass> 9% less than the Lite·Touch Zoom 140ED QD

Lite·Touch Zoom 150ED QD

● AF-S VR Zoom-Nikkor 70-200mm f/2.8G IF-ED

This large-diameter telescopic zoom lens features Nikon’s exclusive built-in Silent Wave Motor (SWM), and employs a Vibration Reduction (VR) mechanism. Magnesium alloy is used at key points on the lens barrel to provide strength, reduced weight and recyclability, while multifunction parts help lower the total number of parts. Despite its impressive capabilities, the lens is even smaller and lighter than its predecessor.
<Reduced product mass> 7% less than the AF-S 80-200 f/2.8D
<Eco-glass usage> 100%

AF-S VR Zoom-Nikkor 70-200mm f/2.8G IF-ED

2. Digital cameras

● COOLPIX 5400

Nikon’s highly advanced optical technologies enable the incorporation of a 4x zoom lens with coverage from 28mm, while still offering reduced weight. The COOLPIX 5400 also boasts high energy efficiency.
<Power consumption efficiency> 50% higher than D1

COOLPIX5400

● COOLPIX 2100

This camera is cleverly designed to afford both a compact body loaded with high-performance functions, and a highly ergonomic design for simple, comfortable operation.
<Longer battery life> 17% longer than the COOLPIX 755
<Reduced product mass> 19% less than the COOLPIX 755
<Eco-glass usage> 100%, including projection lens

COOLPIX2100

Targets

- **Improvement in energy efficiency of 30% or greater for functions on products marketed during fiscal 2003, compared with products sold since fiscal 1998.**
- **Reduction of models using ozone layer-damaging HCFC, used as refrigerant for IC and LCD steppers to fewer than 30% of all products shipped in fiscal 2003, with ultimate goal of total elimination of use of HCFC by the end of fiscal 2005.**

Instruments Company Products

● CNC video measuring systems NEXIV VMR-10080, VMR-H3030

The Nikon NEXIV VMR series of general-purpose, high-precision, non-contact measuring systems are capable of measuring 3D shapes such as electronic parts and precision components, using an optical head with high-power zoom optics and laser auto-focusing, an automatic stage and image-processing capabilities.
(See the NEXIV website at http://www.nexiv.net/eng/index_e.htm for specifications and applications of the NEXIV VMR series.)
The new series employs LED light sources in place of halogen lamps, which greatly reduces generated heat and power consumption while enhancing precision. Measurement speed is doubled thanks to improved controllability, optical characteristics and performance.
<Power consumption efficiency> 300% higher than the previous NEXIV models
<Eco-glass usage> 82% in VMR-10080/79% in VMR-H3030
<Consumables> Number of halogen lamps has been reduced from six to two


NEXIV VMR-10080


NEXIV VMR-H3030

Nikon Group Products

● Fieldscope ED82 (straight body)/ED82 A (angled body)

To meet the sophisticated needs of avid birdwatchers, these Fieldscopes offer large, 82mm-diameter object lenses with multilayer coatings and the bright, sharp imagery provided by a twe-piece ED lens. The waterproof construction helps prevent fogging and the growth of mould in the optical system even if it is pervaded by moisture, providing the durability and ease of use needed for field observation.
The case has also been designed for outdoor use, coloured green to help avoid startling birds and other wildlife. Prisms and lenses use eco-glass, containing no lead or arsenic.
<Eco-glass usage> 100%
<Extended product life> Bundled Stay-on case protects the body against shock; built-in slide hood; reinforced prism holders; waterproofing
<Simplified repairs> Most parts and servicing methods are identical to those of the existing Fieldscope III.


ED82/ED82 A

● Surveying Instrument Pulse Laser Stations NPL-352/332

The successor to the NPL-350, and sister to the DTM-352/332, this Series inherits the unsurpassed reliability of its predecessors through water resistance and long-term field use. It also provides enhanced basic performance, user interface, and is capable of providing a 200m non-prism measurement distance, the longest in its class.
<Reduced power consumption> 15% less than the NST-200N Series (battery life increased from 5.5 to 6.5 hours)
<Reduced parts count> 10% less than the NST-200N Series
<Eco-glass usage> 91% (lead content of optics reduced from the 55.02g of the NST-200N Series to only 0.32g)
<Simplified repairs> The telescope does not have to be disassembled in order to repair the distance measurement system.
The new Pulse Laser Stations also feature less complex optics, fewer adjustments, integration of electrical boards, simpler assembly and automated electrical adjustments. These improvements facilitate assembly and significantly enhance repairability.


NPL-352/332

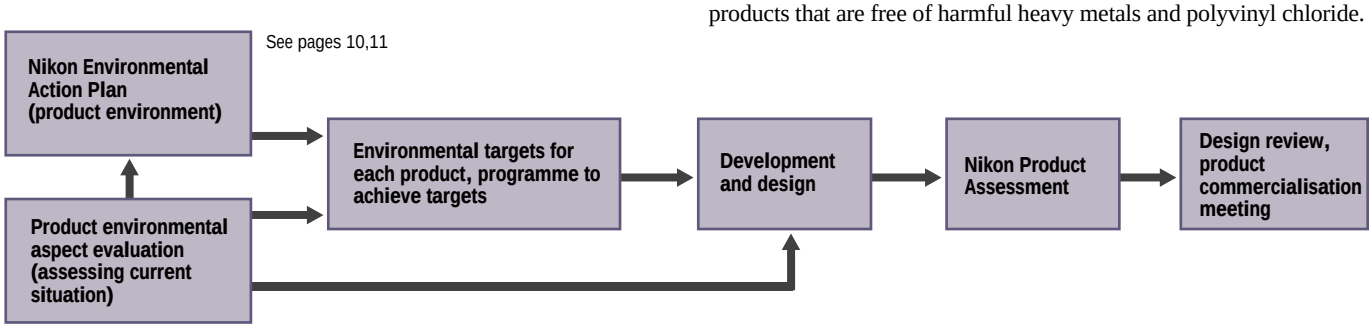
NOTE: Most of the above products were introduced in Japan during fiscal year 2003.

Future Activities

We have established a rigorous system for environment-oriented design activities and enhancement of the ISO 14001-compliant environmental management system. We are applying this system to the development of products, supported by the more aggressive "Nikon Environmental Action Plan" and "Nikon Product Assessment", resulting in an entirely new level of environmental friendliness.

In addition to using lead-free solders, we are striving to develop products that are free of harmful heavy metals and polyvinyl chloride.

See pages 10,11



Activities in the Product Environment

Containers and Packaging

Targets

- **40% reduction in plastic containers used in consumer products in fiscal 2003, compared with figures for fiscal 1999.**
- **Total elimination of non-separable multi-material for new packaging from fiscal 2001 onward.**

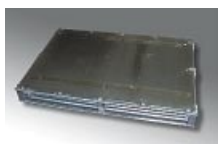
Nikon defined its "Environmental Policy Regarding Packaging Materials" in May 1998, and reviewed it in June 2000. This policy has seven main points:
1. Elimination of harmful substances. 2. Reduction in volume and content. 3. Recyclability. 4. Safety and ease of separation of materials. 5. Use of recycled resources. 6. Reusability. 7. Marking regarding packaging materials and handling precautions.

The activities implemented based on this policy are as described in the following chart:

Theme	Policy	Contents	Application
Non-vinyl chloride film	1. Elimination of harmful substances	Switch from use of vinyl chloride material, which is considered a major source of dioxin, to non-vinyl chloride materials such as polypropylene.	Wrapping materials for equipment such as steppers
Plant-derived filler materials	2. Reduction in volume and content	Plant-derived filler materials are made from bean and wheat husks. They are significantly safer and more environmentally friendly filler materials than those derived from crude oil. We also use biodegradable resins in packaging containing filler materials.	Gap filler (Instruments Company products)
Cushioning film	2. Reduction in volume and content	Support with elastic film enables significantly reduced consumption of cushioning material.	Cameras
Reinforced cardboard boxes	2. Reduction in volume and content 3. Recyclability 5. Use of recycled resources	Adoption of reinforced three-layer cardboard boxes has enabled a significant reduction in weight and volume of packaging in comparison with old-style wooden boxes.	Stepper body (for shipping to certain destinations)
Single-material presentation cases	4. Safety and ease of separation of materials	Use of film in presentation cases has been eliminated. Cases are now made from paper only, for ease of breakdown and decomposition.	Accessories
Assembly-type packaging	4. Safety and ease of separation of materials	The filler material and the cardboard are assembled manually for ease of separation later. Old-style packaging involved a fusing of different materials (cardboard and a crude-oil derived filler material).	Instruments Company products
Steel pallet	4. Safety and ease of separation of materials 6. Reusability	Smoke sterilisation process used with wooden pallets is no longer necessary. This also contributes to conservation of the forests.	Stepper
Pulp moulding	5. Use of recycled resources	A paper filler material consisting of 55% recycled paper. This material is gradually being introduced as an alternative to crude oil derivatives.	Cameras, lenses, microscopes
Dedicated transport containers	6. Reusability	Dedicated containers are used for shipment to certain corporations.	Microscopes
Polyethylene bags	7. Marking regarding packaging materials and handling precautions	All packaging material is marked to facilitate separation. All bags, other than those of extremely small size, are marked with a warning of suffocation risk to infants.	


Cushioning film


Reinforced cardboard boxes


Steel pallet


Pulp moulding

So far, we have achieved the following in our challenge to meet targets:

- In fiscal 2002, use of plastic containers and packaging for consumer products was reduced dramatically — 53% in weight against fiscal 1999 levels, through progressive use of pulp moulding and other techniques. However, in fiscal 2003, it increased to 95% in weight against 1999 levels, due to the dramatic growth of the digital camera business.
- Through the use of single-material presentation cases and assembly-type packaging, as well as other methods, from fiscal 2002 through 2003 we achieved our target of eliminating the use of non-separable multi-material for new packaging in fiscal 2003.

Activities in the Product Environment

Examples of Implementation in Sales and Distribution

Nikon is working tirelessly to reduce the total and long-term environmental impact of its products and services. Since Nikon supplies products worldwide, we must also pay strict attention to sales and distribution activities. The following are some examples of our reuse and recycling efforts in these areas:

1. Sales of used steppers for reuse

Nikon Tec Corporation has been collecting used steppers discarded by customers, and reconditioning and reselling them for new users, with the appropriate services supplied. This is an example of Nikon's willingness and capability to reuse its own products. Fiscal 2003 saw 12 significant achievements, both domestically and abroad.

Nikon is conducting in-depth research on the needs of the semiconductor industry, in order to help companies in the field to expand their businesses. This is another area in which our dedication to environmental preservation, profitability and customer service shines through.

2. Recycling of packaging materials and batteries in Japan

(1) Packaging materials

Nikon have contracted the services of JCPRA (Japan Containers and Packaging Recycling Association) to collect and recycle packaging materials used during the sale of Nikon products.

(2) Batteries

Nikon and many other companies have engaged in cooperative efforts with JBRC (Japan Battery Recycling Center) to collect and recycle rechargeable batteries for digital cameras and other products discarded by consumers.

3. Recycling of packaging materials and batteries in Europe

(1) Packaging materials

Our overseas subsidiaries have contracted the services of DSD (Duales System Deutschland) to collect and recycle packaging materials used during the sale of Nikon products.

(2) Batteries

Our overseas subsidiaries have contracted the services of GRS (Stiftung Gemeinsames Rücknahmesystem Batterien) to collect and recycle batteries for cameras and other products discarded by consumers.