

Activities in the Product Environment

Product Assessment

To minimise the adverse environmental effects of our products throughout their life cycles (see diagram to right), Nikon formulated its own product assessment system in 1995. This system makes it possible to quantify the degree of reduction of environmental impact during product development.

From 1995 we implemented this system in all product development and design departments, in order to gradually decrease environmental loading caused by our products.

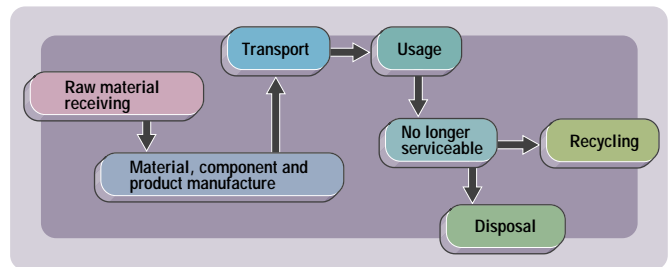
Features of Nikon Product Assessment System

- Priority placed on reducing consumption of resources and energy; recycling; long product life; reduction in use of harmful substances; reduction and simplified processing of waste; disclosure of material information.
- Advance survey and investigation of emerging environmental issues and regulations in each country, and development of Nikon standards that take the characteristics of our products into account.
- Formulated after thorough discussion among product development teams, material engineers and other related personnel.
- Make product assessment mandatory in design reviews and related phases of product development sequences, with procedures and standards clearly defined.
- Continuous revision through item addition and improvement; Version 4 is currently in use.
- Vigilance in product improvement from one model to the next.
- Support designers by building and maintaining an environmental database of material information (eco-glass, flame retardants, etc.), explanatory text and documentation.

Contents of the Nikon Product Assessment

- Continuing reduction in product mass, volume, part count and power consumption.
- Pursuit of extended product life and simpler repair.
- Promotion of recycling of harmful batteries (simplified removal, content marking and explanations).
- Elimination of specific brominated flame retardants (suppression of dioxin in waste processing).
- Reduce use of vinyl chloride (added chlorine and lead, cadmium and phthalates can cause problems after waste disposal).
- Elimination of ozone layer-depleting substances (specified CFCs and alternative substances).
- Marking of materials used (compliance with ISO 11469 international plastic marking standard, parts marking).
- Reduction in use of harmful substances.
- Simplified separation of plastics and metals.
- Reduction in amount of waste generated from consumables; appropriate customer guidance on waste processing.
- Use of optical glass free of lead and arsenic in optical system components such as lens elements (see page 11).
- Strict observance of environmental laws and regulations.
- Overall assessment (comments on degree of improvement, overall assessment points, etc.).

General life cycle for Nikon products



Nikon Product Assessment Record

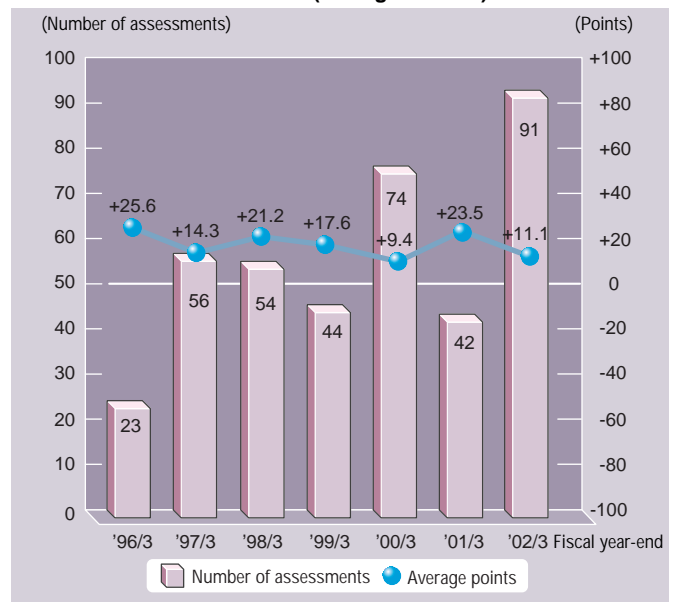
In all Nikon product categories, products are assessed at all stages of development, including prototype and mass production. Efforts to improve environmental friendliness are constant.

If a product shows improvement in terms of environmental friendliness when compared with the prior model, assessment points are awarded. If the product is about the same, no points are given. If it has deteriorated, points are subtracted. The assessment point scale ranges from -100 to +100.

For the seven-year period from fiscal 1996 to fiscal 2002, a total of 384 products were assessed under this programme, with an average assessment of +15.6 points.

Nikon is continuing its efforts to improve and enhance the functionality and performance of all of its products, while releasing new products to world markets, and this assessment indicates that our environmental efforts are gradually being rewarded.

Product Assessment Results (through FY2002)



Environmentally Sound Optical Glass (eco-glass), Lead-free Solder

Targets

- Use of eco-glass in 90% or more of all optical designs in fiscal 2003.
- Begin employing lead-free solder in Printed Circuit Boards from fiscal 2003, progressing so that in fiscal 2006, 100% of PCBs in consumer products and 50% of PCBs in industrial products will be lead free.



Nikon began full-scale work on the development of eco-glass, the environmentally sound optical glass free of lead and arsenic, in 1995. We are employing this new glass in all of our product categories such as IC steppers, cameras and microscopes that incorporate optical systems.

History of Eco-glass Development

Since Nikon was established in 1917 as the first optical glass manufacturer in Japan, we have placed a high priority on the development and manufacture of optical glass designed for use in optical equipment.

As part of our anti-pollution efforts, in the 1970s we developed a new composition for optical glass totally free of cadmium, a toxic material.

In the 1990s, to contribute to the resolution of global environmental problems, we thoroughly reexamined compositions of optical glass bearing in mind the possible effects on the environment. The majority of 70 to 100 types of optical glass contained lead and arsenic. We have recognised that this fact is one of the most significant environmental aspects of our business activities and products. Therefore, we decided to develop a new

Eco-glass Development Highlights

- Fiscal 1996 Eco-glass development project launched full-scale.
- Fiscal 1998 Eco-glass-related items added to Nikon product assessments.
- Fiscal 1999 Eco-glass database completed; employed across the board in optical design.
- Fiscal 2000 Development of eco-glass composition about 80% complete; eco-glass used in 77.1%* of new optical designs.
- Fiscal 2001 Development of eco-glass composition complete; eco-glass used in 86.1%* of new optical designs.
- Fiscal 2002 Eco-glass used in 78.1%* of new optical designs.

The rates of eco-glass utilisation* in new optical designs in various fields are as shown below.

	Fiscal 2000	Fiscal 2001	Fiscal 2002
IC steppers	77.4%	84.2%	73.5%
Cameras and digital cameras	75.4%	82.0%	81.0%
Microscopes and measuring instruments	67.8%	88.4%	83.8%
Surveying instruments, customised products, others	80.8%	90.8%	94.4%
Future product development	100.0%	95.7%	90.8%
Nikon overall	77.1%	86.1%	78.1%

*Rates are calculated based on component units.

Introducing Lead-free Solder

As part of our efforts to minimise the use of harmful substances, Nikon is planning to replace existing lead-tin alloy solder with new lead-free solders made from alloys such as tin-silver-copper.

As one step in implementing this strategy, during fiscal 2002 our Yokohama Plant installed a high-performance reflow furnace for lead-free soldering. After extensive trials in mounting various circuit board types, this furnace will be used for volume production.

An environmental action plan has been developed for future product plans.

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Nikon offers an extensive range of optical equipment and, given this diversity, some products incorporate parts that may not accommodate eco-glass. As far as technically possible, however, we intend to switch over to the new material. We will take the same stance in replacing solder that contains lead with lead-free solder.

environmentally sound glass and employ it in our products.

We demanded that the new glass offer optical performance at least equalling that of the glass in use. As such, the optical glass development department and the optical design department initiated a joint effort to investigate a variety of new compositions and design factors. After development was completed and the supply stance solidified, we began introducing eco-glass into our products. In fiscal 1999, the new glass was used across the board in the optical design department.

Nikon is working to minimise the possible pollutants (air, water, soil and waste disposal sites) used in optical glass, including lead and arsenic, as far as possible throughout the entire product life cycle (raw material production, manufacturing, use and disposal).



Lenses and prisms made with eco-glass

Eco-glass development

The R&D expenditures for the development of environmentally sound optical glass were as follows:

Fiscal 1997	¥21 million
Fiscal 1998	¥82 million
Fiscal 1999	¥145 million
Fiscal 2000	¥148 million
Fiscal 2001	¥14 million



High-performance reflow furnace for lead-free soldering