

Creating Environmentally Friendly Products

Transforming the structure of society to reduce risks from events such as increasingly large-scale natural disasters related to climate change and to prevent the depletion of natural resources is a common challenge for humanity. Toward that end, companies are expected to make positive contributions through their products and services. This includes the development of new technologies, making those newly developed technologies even more sophisticated to aid in environmental protection, and increasing utilization of renewable energy.

Policy

● Harnessing NSK’s Four Core Technologies to Help Reduce the Environmental Impact of Human Societies

The products of the future must perform better than today’s in order to help reduce the impact human societies have on the natural environment. In an effort to contribute to the well-being and safety of society and to protect the global environment, as spelled out by its corporate philosophy, NSK is working hard to accurately determine the needs of its customers and the broader society, as well as to develop environmentally friendly products and technologies which, in keeping with its basic policy, make the most of the Company’s four core technologies (tribology, materials, numerical simulation, and mechatronics). By delivering these products and technologies to all corners of the globe, NSK aims to contribute to the sophistication of the machinery in which its products are incorporated and to the development of environmentally friendly products as well as to the reduction of environmental impact throughout society.

Basic Policy for the Development of Environmentally Friendly Products

The NSK Group minimizes the environmental impact of its products at every stage—from R&D and design, to production, usage, and disposal—by upholding the following standards:

1. Each product should contribute toward the energy and resource conservation of the machine in which it is installed.
2. The amount of energy and resources required during product manufacturing should be minimal.
3. Environmentally harmful substances should not be used in products or manufacturing processes.
4. Products should contribute to the health and safety of end users by having low emissions of vibration, noise, and dust.

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Mid-Term Targets (FY2016-2018)

The NSK Group is creating even more environmentally friendly products and technologies based on the NSK Environmental Policy and the Basic Policy for the Development of Environmentally Friendly Products. It also calculates how much its products help to reduce CO₂ emissions during use.

FY2015 Activities

In fiscal 2015, the NSK Group developed nine new environmentally friendly products that help customers conserve energy and resources. The total number of environmentally friendly products developed since 2002 comes to 211.

● NSK Eco-Efficiency Indicators

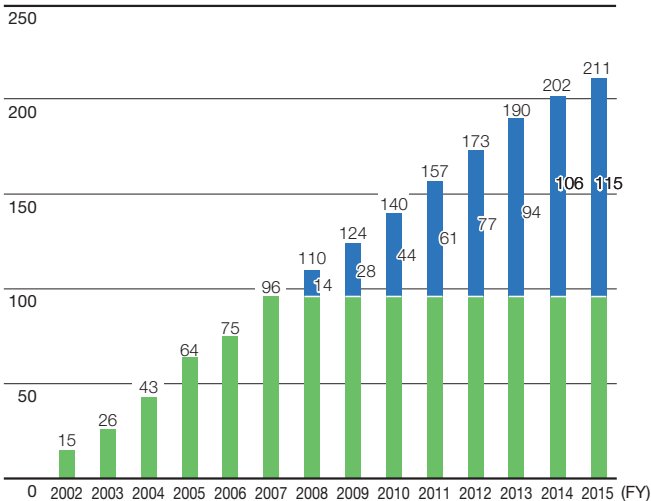
In fiscal 2008, NSK introduced the NSK eco-efficiency indicators (Neco) as a yardstick for quantitatively assessing the degree of environmental friendliness possessed by the products it develops. Since that time, the Company has utilized Neco to conduct assessments of products under development.

The Neco score is represented by a numerical value obtained by dividing product value V and environmental impact E. The numerator V represents, in numerical form, the degree of improvement of a product in development were an existing product assessed at 1 with regard to assessment parameters that need to be increased to improve product value, such as service life, performance and accuracy. By comparison with an existing product, the denominator E represents assessment parameters, such as product weight, power consumption and friction loss, that must be reduced to decrease the environmental impact.

To use bearings as an example, the longer a product's service life is when compared with an existing product, the better able that product is at withstanding high-speed rotation, the lighter and more compact it is, and the less friction loss there is, the higher its Neco value will be. The NSK Group is working to develop new products with a Neco score of 1.2 or higher.

● Number of Environmentally Friendly Products Developed (Total)




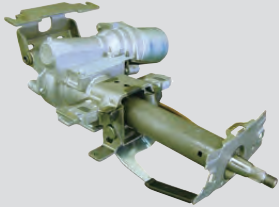

Products (total)



$$\text{Neco} = \frac{\text{Product value V (product life, functions)}}{\text{Environmental impact E (product weight and power consumption)}}$$

- Newly developed products with a Neco score* of 1.2 or higher
* Established in fiscal 2008
- Newly developed products consistent with the Basic Policy for Development of Environmentally Friendly Products established in fiscal 2001

● **Environmentally Friendly Products Developed in Fiscal 2015**

NSK Products	Technology Developed by NSK	Environmental Benefits for NSK's Customers	Neco
<p>Spherical Roller Bearings Featuring High Reliability and Excellent Sealing Performance for Conveyor Pulleys in Mines</p> 	<ul style="list-style-type: none"> ● Smaller bearings Using original material developed by NSK for the inner and outer rings and applying special heat treatment has increased the load capacity and enabled the inside of the bearings to be more compact ● Higher sealing performance High sealing performance has been achieved by using a seal with a long track record of preventing foreign substance intrusion 	<ul style="list-style-type: none"> ● Longer life of conveyor pulleys Service life four times longer than the conventional product has been achieved for mine conveyor pulleys used in harsh environments 	2.9
<p>Ball Bearings for Fan Clutches with an Excellent Sealing Performance</p> 	<ul style="list-style-type: none"> ● High sealing performance Guards against dust, dirt and muddy water with an slinger* and more seal lips <p>* A circular metal part pressure-fitted on the inner ring of the bearing to prevent the intrusion of dirt, etc.</p>	<ul style="list-style-type: none"> ● Longer life of fan clutches Achieved a longer life in harsh environments by substantially improving the sealing performance 	1.7
<p>Super Large Ball Screws with World-Top-Class Load Capacity</p> 	<ul style="list-style-type: none"> ● Development of grinding technology Developed technology that can grind long nuts up to 800 mm, 1.4 times longer than before 	<ul style="list-style-type: none"> ● Improved working environment The working environment has been improved by eliminating the use of oil through electrification of large injection molding machines and presses 	1.2
<p>World's Lightest Electric Power Steering (EPS) Systems</p> 	<ul style="list-style-type: none"> ● More compact Made more compact through optimal design of torque sensor, reduction gear, and gear box ● Continuity of EPS operation Improved continuity of EPS operation and safety during an idle reduction 	<ul style="list-style-type: none"> ● Improved automobile operability Continuous EPS operation is possible even when the power supply from the battery is reduced during an idle reduction (an idle reduction can be maintained even when operating the steering) ● Improved automobile safety Addition of an initial test of the torque sensor's monitoring function on start-up improves safety 	1.3
<p>Sprag One-Way Clutches with Block Bearings</p>  <p>Block bearing</p>	<ul style="list-style-type: none"> ● Reduced drag torque Drag torque has been reduced during idling by around 70% by changing the bearing structure of one-way clutches from end bearings to block bearings 	<ul style="list-style-type: none"> ● Improved automotive fuel economy Helps improve fuel economy by reducing drag torque 	1.4

 Reference data is available on NSK's website.
 www.nsk.com > Company > News > Press Releases